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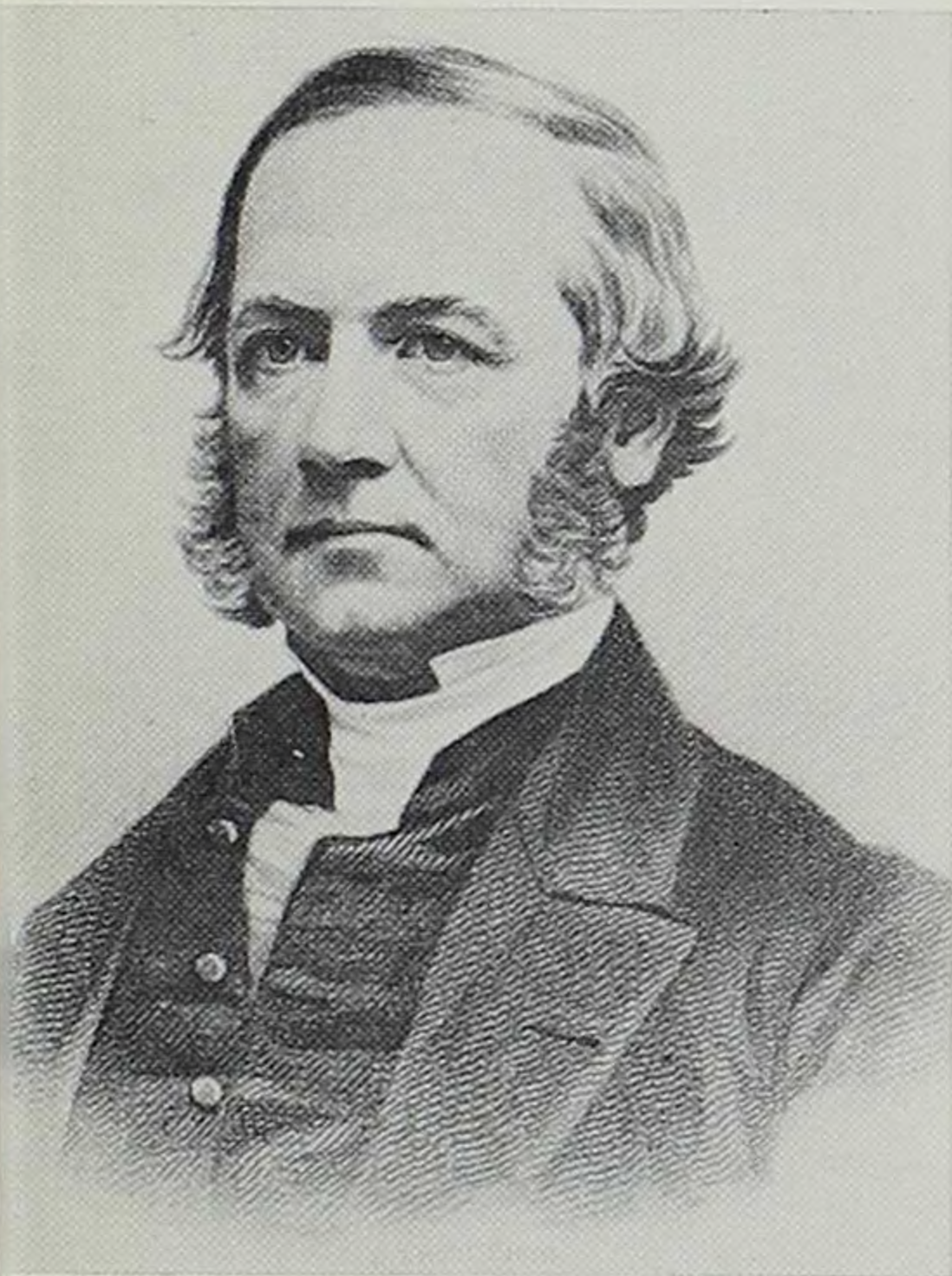
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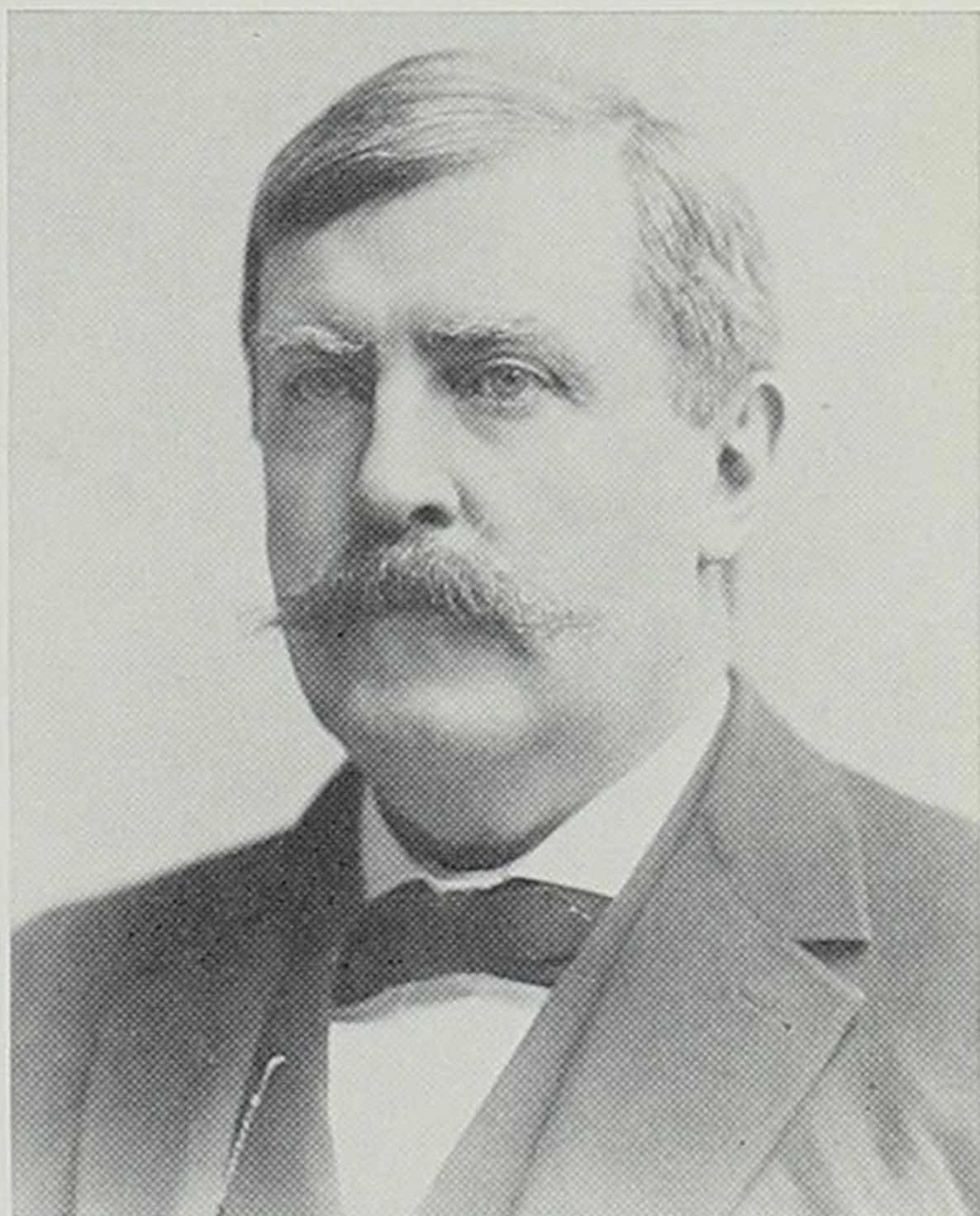
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The **PALIMPSEST**



Charles Mason



Benton J. Hall

Iowa Inventors and Inventions

PART ONE

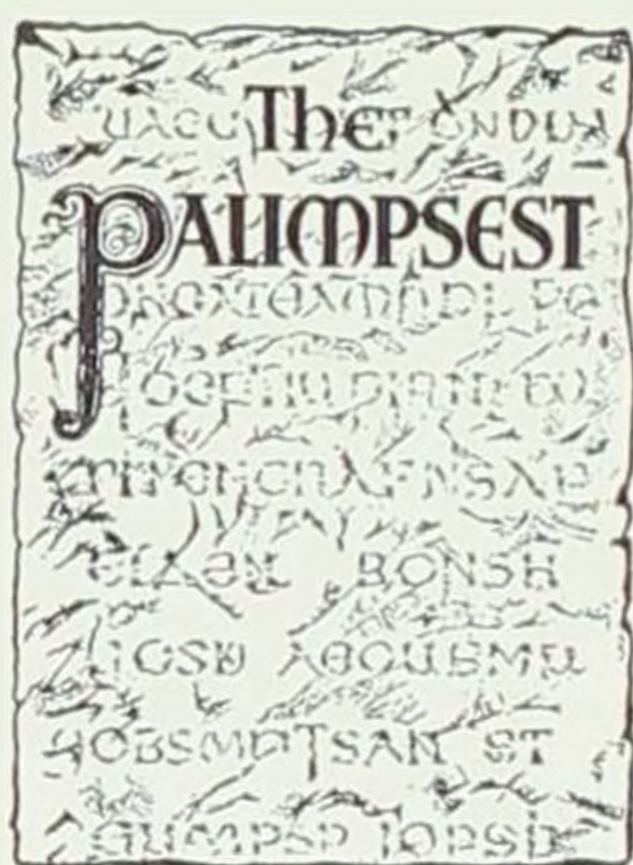
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The Meaning of Palimpsest

In early times a palimpsest was a parchment or other material from which one or more writings had been erased to give room for later records. But the erasures were not always complete; and so it became the fascinating task of scholars not only to translate the later records but also to reconstruct the original writings by deciphering the dim fragments of letters partly erased and partly covered by subsequent texts.

The history of Iowa may be likened to a palimpsest which holds the record of successive generations. To decipher these records of the past, reconstruct them, and tell the stories which they contain is the task of those who write history.

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IOWA INVENTORS AND INVENTIONS

HOMER L. CALKIN — CORRINE CALKIN

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Illustrations

All illustrations, drawings, and photos were gathered by Dr. and Mrs. Calkin in the United States Patent Office in Washington.

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THE PALIMPSEST

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United States Patent Office

Plato referred in his *Republic* to "necessity . . . [as] the mother of invention." Since then many people have been interested in the inventor, his inventions, and the protection of his rights by the granting of patents. A patent gives an inventor the right to exclude others from making or selling the invention covered by the patent. In other words, he has been granted a monopoly for the period of time stated in the patent.

Before the Constitution of the United States was adopted, many of the American colonies and states issued patents. The first patent was granted by the Massachusetts General Court to Samuel Winslow in 1641 for a new method of making salt. The same Court granted the first patent on machinery to Joseph Jenkes in 1646 for a mill to manufacture scythes. Unlike modern ones these early patents were issued only by special acts of the legislatures.

When the various state delegates met in Philadelphia in 1787 to draft a Constitution, one of

their problems was the protection of inventors and authors. James Madison proposed that Congress have the power "to encourage by premiums and provisions, the advance of useful knowledge and discoveries." A proposal by Charles Pinckney of South Carolina would give the government the authority "to grant patents for useful inventions."

Article I, Section 8 of the United States Constitution as adopted gave Congress the right "to promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and inventions."

When the second session of the First Congress convened in January 1790, George Washington addressed them. In his recommendations he stressed the importance of encouraging inventions:

The advancement of agriculture, commerce, and manufactures, by all proper means, will not, I trust, need recommendation but I cannot forbear intimating to you the expediency of giving effectual encouragement, as well to the introduction of new and useful inventions from abroad, as to the exertions of skill and genius in producing them at home.

Congress responded quickly and passed the first patent act on April 10, 1790. It defined an invention as "any useful art, manufacture, engine, machine, or device, or any improvement thereon not before known or used." The responsibility of granting patents was placed with a "Patent

Board" consisting of the Secretary of State, the Secretary of War, and the Attorney General.

Thomas Jefferson, as Secretary of State, was the moving spirit of the Board. Being an inventor of considerable merit, he made a personal examination of all patent applications that came before the Board. The first patent was issued to Samuel Hopkins of Pittsford, Vermont, for an improvement in making potash. Three patents were issued the first year. A total of more than three million had been issued to 1968.

On June 27, 1790, Jefferson wrote that the act authorizing "the issuing of patents for new discoveries has given a spring to invention beyond my conception." He summarized these discoveries for which patent applications were being made:

"Many of them indeed are trifling, but there are some of great consequence which have been proved by practice, and others which if they stand the same proof will produce great effect." The same could be said for those later inventions of Iowans.

New legislation was passed in 1793. An application was no longer examined for its novelty and usefulness. By the new "registration" system, a patent was granted to anyone who applied, submitted the proper drawings, and paid the necessary fee. The issuance became little more than a clerical function.

The Patent Act of 1836 re-established the

American system of examining each application to determine if it had been invented or used before. When issued, the patent was good for fourteen years, subject to an extension of seven years. The application fee of \$30 was established. The Patent Office was established as a distinct and separate bureau in the Department of State. It was placed in charge of a Commissioner of Patents appointed by the President.

In 1839 the Commissioner was also assigned the duty of collecting and publishing statistics and other information on agriculture. The Patent Office continued this work until the Department of Agriculture was created in 1862.

The Patent Office was transferred in 1849 from the State Department to the newly created Department of the Interior. It remained there until 1925 when it came under the jurisdiction of the Department of Commerce.

In 1861 the term of a patent grant was increased from fourteen to seventeen years, without any extension of the time. Meanwhile, the fee was increased to \$35.

The Patent Office occupied many homes during the first twenty years. From 1810 to 1836 it was housed in Blodgett's Hotel. When the government purchased it in 1810, it had fallen into decay. It had never been finished nor occupied as a hotel.

This was the only government building which was not burned by the British in 1814. Dr. Wil-

liam Thornton, who had designed the United States Capitol Building, was in charge of the Patent Office at the time. He told the British that burning what was useful to all mankind would indeed be a barbarous act.

When the Patent Office outgrew Blodgett's Hotel, Congress authorized in 1836 the construction of a new building. Its architecture was Grecian Doric, the details being modeled after the Parthenon. The Patent Office continued to occupy this building until 1932. It is now the home of the National Portrait Gallery of the Smithsonian Institution.

The comments of two Americans sum up the importance of American inventive genius. Ralph Waldo Emerson wrote: "Invention breeds invention." Abraham Lincoln said, "The patent system added the fuel of interest to the fire of genius in the discovery of new and useful things."

Charles Mason

Charles Mason was a soldier, author, lawyer, pioneer, and jurist, in addition to being the fifth Commissioner of Patents. He was born at Pompey, New York, October 24, 1804. He attended the United States Military Academy, graduating first in the class of 1829. Robert E. Lee was a classmate of his.

Mason served as assistant professor of engineering at the Academy for two years. In 1831 he resigned from the army to study law in New York City, being admitted to the bar the next year. From 1832 to 1836 he practiced law at Newbury, New York, and New York City. For a time, he was also acting editor of the New York *Evening Post* during the absence of William Cullen Bryant.

In November 1836, he moved to Burlington, Iowa, and the next year became district attorney in Des Moines County. President Van Buren appointed Mason Chief Justice of the Supreme Court of the Iowa Territory on July 4, 1838. He retired from this position on May 16, 1847. Mason was one of the commissioners who revised and codified the laws of Iowa in the Code of 1851. He was also president of two western railroads in 1852 and 1853.

President Franklin Pierce appointed Charles Mason Commissioner of Patents in March 1853. Mason was never too happy in this position, having frequent clashes with the Secretary of Interior under whom he worked. In addition his salary of \$3,000 was not adequate for a man with his business interests and professional ability. He resigned August 1, 1857, and returned to Burlington to practice law. From 1861 to 1881 he practiced law with a Washington, D.C., law firm. Mason died at Burlington on February 25, 1882.

In addition to his varied experience in military, political, financial, and legal fields, Mason had other qualifications for Commissioner of Patents. He had considerable mechanical genius. He was interested in farming and machinery, including steam tractors and harvesters. Mason was a practical farmer on a large scale, being a heavy investor in Iowa and Wisconsin lands.

When he assumed his office, the Patent Office had been irregularly administered, indifferently housed, and inadequately financed. Mason was to bring system and efficiency to the operation.

Mason's first problem was to get more room in which to work. He was especially concerned about the models submitted with patent applications. They were exposed "to constant danger of injury and destruction." Mason wrote of the rejected models which had been placed in the basement:

The plight to which they have been reduced for want of space is such as to elicit loud complaints from those who deposited them. . . . They have been heaped upon one another, lost from search, and exposed to injury. Many of them have been broken. . . . These models should be . . . brought from their present dark and inconvenient recesses . . . and exposed to the clear light of the upper day.

Mason had the trophies of the American Exploring Expedition removed from the hall originally designed for the models. The models were then exhibited to the great joy of the inventors.

Mason soon introduced many innovations and changes. Accurate descriptions and drawings of all patents were printed for the first time. When he took office, American citizens were charged \$30 for a patent while British subjects paid \$500 and other aliens \$300. Mason recommended that everyone be placed on the same footing.

Business was increasing rapidly. During the four years prior to 1853 the average number of applications each year was 2,522. During Mason's tenure it was about 4,000. Prior to 1853 the number of patents issued annually was 990; after 1853 it increased to about 1,850.

To cope with this greater work load Mason had a staff in 1856 that consisted of a chief clerk, 12 examiners, 12 assistant examiners, a draftsman, an agricultural clerk, a machinist, a librarian, and about 50 clerical employees. In addition, the law permitted him to hire "temporary clerks" to make copies of patents. They received ten cents for

each 100 words they copied. Without sufficient office space much of this was done by copyists working outside the office. A few women had been employed to do this work at home in the late 1840's and the early 1850's.

Commissioner Mason employed women on a more regular basis. He probably was the first one to use them for more than temporary work for brief periods of time. He also paid them the maximum amount permitted by the law, the same rate paid to men for the same work. After he removed the patent models from the basement, Mason used it as quarters for the women copyists. Thus, he became the first government official to permit women to do their work within a government building. This aroused some opposition, especially on the part of his chief, Secretary of Interior Robert McClelland.

Among the women Mason hired was Clara Barton, who later became famous as a Civil War nurse. She began work in April 1855. During her first three months of April, May, and June she was paid \$71.35, \$93.39 and \$83.35, probably more than she received as head of the school in Bordentown, New Jersey, where she had taught. The thing that undoubtedly recommended Clara Barton to Mason was her neat, precise, beautiful handwriting which could be read as easily as print.

The *Scientific American* summed up Mason's contributions to the Patent Office:

Mr. Mason came into power in May, 1853. At that time the affairs of the Patent Office were in such a lax and disgraceful state that it took from six months to a year to get a patent through, and as much longer to obtain a hearing on an appeal. With an energy wholly unknown to his predecessors, he set about the work of renovation and reform, determined, if it was in the power of man, to restore the Department to respectability and usefulness. Before the year closed he had so far completed his herculean task that inventors were enabled to receive their patents within a less number of weeks, after filing their applications, than they had previously waited months and before the close of his administration, patents were often ordered to issue within six days after the application was placed on file. We need hardly say that under his admirable direction every other branch of the service was brought up to the same standard of promptness and efficiency, and the whole department, reinvigorated and organized.

At another time the *Scientific American* said of Mason's work at the Patent Office:

Our readers are familiar with the history of his reforming operations; they know he gradually rescued the department from its deplorable condition, infused new life apparently into the entire patent system, put an end to those deadly delays in the issue of patents which had so long disheartened inventors, increased business and revenues, and then, to the regret of all, left office.

Benton J. Hall

The twenty-first Commissioner of Patents was also an Iowan. Benton J. Hall was born in Mt. Vernon, Ohio, on January 5, 1835. Five years later his father, Jonathan C. Hall, brought the family to Iowa. Jonathan Hall became one of the first Justices of the Iowa Supreme Court, an influential member of the First Constitutional Convention, instrumental in the formation of the Iowa Civil Code of 1851, and a distinguished lawyer of the state.

Benton Hall received his first education at Howe's Academy at Mt. Pleasant. He was a student at Knox College for a while and graduated from Miami University at Oxford, Ohio, in 1853. Benton began studying law with his father in 1856 and was admitted to practice the next year.

Hall was elected to the Iowa Legislature in 1871 and took an active role in formulating the Iowa Code of 1873. He was elected to the State Senate in 1881 and to the United States Congress in 1884. As representative of the First Iowa Congressional District, he was the first Democrat to be elected from that area following the Civil War.

After Hall's defeat for re-election in 1886, President Grover Cleveland appointed him Com-

missioner of Patents on April 11, 1887. He served until March 31, 1889, when Benjamin Harrison appointed a Republican to the office.

Hall was Commissioner during an era of many inventions involving mechanical and scientific marvels. More than 35,000 applications for patents were being made each year. Upon taking office it was his responsibility to direct and regulate the examination of these applications. In many cases he had to make decisions himself on the perplexing and complicated questions involved.

The Commissioner was noted for being "careful, studious, painstaking, gentle, modest, good-natured as to nonessential red tapeism and routine, but stern, rigid, and unbending in all essentially vital things."

Hall declared that the "Rules of Practice" must be followed in granting patents. He said the Patent Office "should not overlook the fact that it must be shown that invention was exercised in producing the article or machine." A person making a new and useful machine had not necessarily invented anything original.

He further pointed out:

The patent system was not designed to protect the chimerical schemes of visionaries or closet theorists. Invention consists in more than the work of the imagination. To conceive a scheme of vast dimensions is the work of a dreamer; to make the mathematical computations requires the ordinary knowledge of the student; to face the diffi-

culties of construction and devise means to overcome them is the true work of the inventor.

His decisions were written clearly, in a polished and literary style. Their clarity, aptness of figurative speech, sound reasoning and logical deduction revealed the careful consideration and study that he gave each problem.

One important case, attracting national attention, that came before him for review involved the telephone. For nearly two weeks, he heard oral arguments from some of the best lawyers of the country. The record totaled some 17,000 pages. In spite of this he was able to grasp the many technical phases of the complicated case and render a decision that prevented a monopoly beyond the seventeen years normally granted to a patentee.

Commissioner Hall has been ranked as one of the greatest in a long line of able persons who have administered the affairs of the Patent Office. After leaving Washington in 1889, he went to Chicago where he opened an office and practiced patent law. When his health became impaired, he returned to his home in Burlington where he died on January 5, 1894.

Inventing in Iowa

People from Iowa were joining the list of American inventors while it was still a territory. On January 20, 1843, John Godden of Pittsburgh, Van Buren County, received Patent No. 2,922 for his flax and hemp breaking and cleaning machine. His invention added a second frame of slats which made the cleaning of flax and hemp more effective. Godden had lived in the area for at least a year or two. In the early 1840's the Iowa territorial government had granted him and his family exclusive rights to build a dam across the Des Moines River.

The next Iowan to receive a patent was J. Hobart of Dubuque. He patented a new process for auger mining on May 23, 1846. In the early years of statehood, few were concerned with inventing new machines or developing new processes. Only 168 patents were issued to Iowans through 1860.

The inventions for the first ten years covered many needs. They included an awning for horses, barrel head cutting machines, a cultivator axle, a water wheel, digging machines, an extension table, fence, hand looms, an excavator, an engine governor for side wheel ocean steamers, a process for making white lead, a locomotive cow catcher, a

locomotive for ascending inclined planes, airtight mail bag, paper clip, seed planter, plow, smut machine, stoves, windmills, brick presses, a candle mold, a machine for making clothespins, a lathe for turning fancy handles, a worm tub for stills, a railway car coupling, and a head support for railway cars.

The inventors came from a number of towns—New Oregon, Muscatine, Burlington, Cedar Rapids, Osceola, Iowa City, Mt. Pleasant, Columbus City, Dubuque, Madison, Clay, Salem, Davenport, Harrisburgh, Charleston, Oskaloosa, and Farmington.

As the Civil War neared its end, there was an upswing in the number of inventions. In 1865, 104 inventions were patented. Between 1843 and 1873, the peak year was 1867 with 247 patents being issued to Iowans. After that year, there was never less than 201. A total of 2,325 patents were granted to Iowans during the thirty year period.

These more than 2,300 inventions were produced by 1,910 inventors. In some cases two or more persons worked together to get a patent. An inventor did not always work with the same person. For instance, H. C. Kellogg of Quasqueton joined with T. Langdon to patent a broom. In 1863 J. B. Edgell and E. A. Alexander were Kellogg's partners in patenting a churn. These three were joined by G. P. Martin the same year in in-

venting a grain binder. Kellogg was the lone inventor of a combined sower and cultivator in 1869. In a few cases the invention was the joint effort of an Iowan and someone from another state.

A total of 344 Iowans received two or more patents. G. R. Moore of Lyons was the most prolific among Iowa inventors. His 18 patents included a corrugating machine, three drains, two fire chamber cleaners, two coal and two heating stoves, a stove pipe connection, doors for a stove, a water pipe valve, two car couplings, a flat iron heater, a damper for a flat iron heater, and a process for the construction of corrugated sheet metal boilers.

Edwin J. Toof of Fort Madison received 14 patents. His inventions were a comb cleaner, a three horse draft equalizer, a hay elevator, a horse rake, a lamp extinguisher, a paper clamp and inkstand, a paper holder, four sewing machine rufflers, a try square, and a wick regulator.

A. Johnston of Ottumwa patented 12 attachments for sewing machines, including a needle setter, threader and cutter, a tuck creaser and embroidery, gathering, ruffling, and plaiting attachments. Likewise, the eight inventions of R. J. Mann of Burlington were closely related. He received patents for metallic sieves, a method for constructing them and for machines to construct sieves.

The eight patents received by H. P. Jones of Davenport were more varied. They were two dough kneaders, two steam valves, two washing machines, a tatting shuttle winder, and a binding attachment for reapers. The inventions of A. Ingalls of Independence pertained to farming, sugar making and blacksmithing. His eight patents were for a grain drill, a plow, a seeder and cultivator, a seeding machine, a mill for crushing sugar cane, a saccharine juice evaporator, a tire heater, and a tire upsetting machine.

A further breakdown shows five persons receiving seven patents, eight receiving six, 13 receiving five, 29 receiving four, 67 receiving three, and 216 receiving two patents.

Sometimes the patents received by an inventor were concentrated in a single field. Johnston and Mann are good examples. There were many others of a similar nature. In other cases the inventor was interested in a variety of things as we have seen with Toof, Ingalls, Moore, and Jones. Some concentrated mostly in one area but did do other things. For instance, David Hargar of Des Moines was well-known for his patents on furnaces; he also patented a car coupling and a formula for a roofing composition.

The inventors came from 395 cities, towns, and townships. Davenport had the largest number with 100. Des Moines had 80, Dubuque 70, Burlington 57, and Muscatine and Oskaloosa 53 each.

Among the counties Scott County had the most with 112 inventors receiving 143 patents. Lee County was next with 108 inventors and 139 patents. Other counties with more than 80 inventors were: Henry County, 85 inventors and 95 patents; Polk County, 84 and 99; Dubuque County, 82 and 126; and Buchanan County, 81 and 102.

Six counties had between 50 and 80 inventors; 15 counties between 25 and 50. Twenty counties—14 in the northwestern part, three in the north central and three in the southwestern part of the state—were not represented by any inventors before 1874. They were still largely frontier areas, slower to become populated, and probably more concerned with establishing homes and earning a living than in applying for patents.

The apparent need for a new machine, process, or method of operation probably led to many of the inventions. Some inventors had an urge to make something new or different and were constantly looking for new ideas to develop. Undoubtedly others were motivated by the lure of profits.

Some inventions were closely related to the trade, business, or manufacturing in which the inventor was engaged. Some were the result of long periods of trial and error; others were probably largely spontaneous in nature.

Many inventors did not receive patents the

first time their ideas were submitted. After being rejected, portions of the applications were revised, claims of new ideas were modified, and the applications were resubmitted. Many inventors possibly never even bothered to apply for a patent.

An 1869 account in the *The Iowa State Register* (Des Moines) of the development of a corn harvester provides an interesting story of how new inventions were sometimes developed. Henry Hospers of Pella had a son, Nicholas, who might soon be classed "with the 'inventors of the nineteenth century,'" the paper said.

Young Nicholas had a workshop in the upper part of the barn where he spent all of his time on rainy days. About a year before, he had decided there might be a better and faster way of cutting corn than by hand. Soon he had made a machine. The first time he pulled it through the field by hand so as to keep it secret.

The machine had deficiencies so Nicholas took it back to the barn, tore it apart, and remodeled it. This time he hitched a horse to it. Before night he had cut down and laid fifteen acres of corn in nice piles.

The stalk cutter could be worked by one or two horses. A knife cut off the corn which fell into bins that held four to six hills. Then by a lever the corn was dropped into piles to be shocked later. Young Hospers did not patent his invention at once. A man from Keokuk offered him

\$5,000 for it, but Nicholas would not sell. Instead he entered into an agreement with the man, M. Sellers, and they got a patent on January 12, 1869. Later Hospers patented a churn dasher.

The writer for the *Register* concluded:

With such boys as young Hospers and Canfield [of Lyons], and many others not yet brought before the public, what the future is to develop no one can say with absolute certainty; but the reasonable inference is with these great "laborsavers" to till and harvest the crops, and our net-work of railroads reaching from ocean to ocean to carry them away, the vast farms of the west shall be reckoned by the square mile instead of the acre, and steam shall do the plowing and sowing, and the reaping and the mowing, and the gathering of the harvests, and manufactories of every kind shall be thick in the land, and newspapers shall circulate by millions instead of thousands, and fortunes will be accumulated on this continent, such as the whole world has hitherto not known.

Inventing had its political side too. When the Know Nothing Party was ascendant in several states, it was asserted that the Germans in the United States never invented anything. One Know Nothing politician asked, "Did you ever know a d—d Dutchman that ever invented anything after he came to this country?"

The Council Bluffs Bugle of March 16, 1859, wrote: "We are happy now if we were not then to be able to answer this question in the affirmative. Our old and esteemed German friend, G. H. Waldin [of Burlington], has invented a Watch-

maker's Lathe which bids fair to supersede all other Lathes now in use." Waldin received Patent No. 23,050 on February 22, 1859, for his invention.

The *Bugle*, quoting from the Burlington *Daily State Gazette*, said that by the use of Waldin's new and simple improvement all the more difficult portions of watchmaking and repairing, such as the turning of cylinders, verges, and pinions, could be done more easily. All kinds of pivot work could be produced with perfect accuracy.

It could be done with little labor, infinitely faster than by the old process. The article ended, "We hope to see Mr. Waldin handsomely remunerated for so important a contribution to the mechanic art."

As might be expected from an agricultural state, many of the inventions were improvements in farm implements. Many others pertained to the day-by-day life of the people. However, there were numerous inventions of a more unusual nature. They were as varied as the backgrounds, the abilities, and the interests of the inventors.

The following descriptions and illustrations of selected inventions and processes and the listings of all the patents by the different categories show the versatility, the imagination, the practicality, and the originality of Iowa inventors.

Farm Implements

In a state where agriculture was the primary activity, it was only natural that emphasis would be given to farm implements. Approximately 590 patents, or more than one-fourth of those granted, were given for new or improved machines for preparing the land, plowing, planting, cultivating, harvesting, and milling the crops.

Many inventors also manufactured their products. For instance, H. H. Ballard, who patented a mole plow with H. McClure in 1861, became superintendent of the Mt. Pleasant Foundry and Machine Works. In 1864 S. D. Morrison and his sons established a plow works on Front Street, Fort Madison. He patented a plow in 1871, and one of the sons a three horse splinter bar in 1866.

Some brought experience gained in other countries. Henry Barnes of Franklin Township, Story County, was a native of Manchester, England. He received a patent in 1869 on a plate for making blanks for mold boards and shares for plows. He had started to perfect it before coming to Iowa.

William D. Harrah and Benoni S. Baldwin of Davenport patented a seed planter (primarily for corn) on August 9, 1859. The rotation of the leading wheels and their shaft caused markers to

strike the ground at suitable intervals. A sliding frame was operated by the wheels also. The seed dropped through holes and tubes at each stroke of the slides.

A hand corn planter was devised by D. H. Howell of Independence. Combining seed conveying tubes, seed boxes, and a seed distributing device, the planter could be manipulated by hand and two rows of corn planted simultaneously.

A corn planter invented by W. E. Rich, of New Providence, planted the corn in check rows. It also covered and rolled it at the same time. Charles R. Rand of Dubuque was really ingenious. He invented an interchangeable frame that could convert the implement at will into a corn planter, corn drill, grain drill, hay rake, hay tedder, cultivator, gang plow, or potato digger.

More cultivators than anything else—at least 111—were invented. R. D. Dodge of Adel connected the plows of the cultivator to each other and to the main frame so each plow would adjust itself to the unevenness of the ground entirely independent of the others. The plows, or part of them, could be given a side motion. In this way both sides of a hill of corn could be cultivated as closely as desired.

C. W. Stafford of Burlington patented a mole plow or cultivator in 1860. The *Farmers' Northwestern Almanac* for 1864 commented on it:

Now-adays the farmer by the judicious selection of

good machinery and implements, makes many of the old tedious and laborious operations of farming comparatively light and pleasant. Who would have thought twenty years ago of riding in a sulky to plow out corn. Mr. Stafford the inventor of the valuable machine . . . claims when he perfected it he had in view the following points: First, that the Cultivator should work well and thoroughly; Second, that it should be easily guided and managed by the operator; Third, simplicity of construction; Fourth, ease of draft; Fifth, riddance of manual labor. The driver controls the direction of this Cultivator with his feet in a very simple and effective manner, having both hands free at all times to manage his team. It will cultivate ten or fifteen acres per day.

Attached to the Cultivator is a *fender*, which effectually prevents the small corn from being covered. . . .

On his cultivator Jacob Reedy of Toledo arranged two rows of teeth so they removed clods and refuse from the corn and deposited them between rows. At the same time the ground was pulverized and leveled, leaving it in a condition most favorable to growth of the crop and destruction of weeds. "The completeness of its work, its cheapness and extreme simplicity of construction, all combine to make it one of the best implements for the cultivation of corn on our prairies," according to the *Des Moines Register*.

The paper reported that Reedy was a Tama County farmer of "rather unpretending appearance, but not entirely destitute of that peculiar Yankee characteristic which leads to whittling out of new forms from pine sticks with jackknives."

Some people apparently were critical of riding cultivators. S. G. Mills of Des Moines, who had patented his in 1866, wrote to the *Register* in June 1868, "All I ask is to have the farmer examine the Cultivator, and not be foolish enough to cry out *humbug!* until he has tried it."

Iowans came forth with many improvements for binders, reapers, and harvesters. Some were attachments to bind the grain, drop it in piles, etc. For instance, Thomas Boyd of Des Moines patented a harvester that discharged Indian corn or maize in shocks or bundles of any suitable or desired size.

Winfield Denton of Iowa City invented a device for loading hay on the wagon or cart, easily and conveniently without the necessity of hand pitching.

Once the crop was reaped and bound, it was necessary to separate the grain from the straw and chaff. The grain separator of J. C. Parmater and E. H. Bowen of Vinton was made of a series of zinc and wire screens.

Several invented potato diggers. Ira Curtis of Des Moines intended to start manufacturing his immediately after he got his patent on April 6, 1869. One observer wrote, "This new anti-back-breaker will dig up all the potatoes and sack them as it trots along, and is drawn by two horses. It's a 'cute' invention and competent judges say it will do all that is claimed for it."

Land Preparation

Harrows (17): Atwood, New Sharon; Benson, Belle Plaine; Depeny, Hamburg; Friedemann (2), Waverly; Heffner, Homer; Hollingsworth, Mt. Pleasant; Kilgore, Washington; Lewis, Elkader; Lezott, Osage; Marinus, Whait & Whait, Independence; Osborn, Mt. Pleasant; Paddington, Springville; Reimer & Asbahr, Davenport; Safley, Mt. Vernon; Swanson, Swede Point; Taylor, Golden Prairie.

Harrow and cultivator combined (2): Bressler, LaFayette; Whait & Whait, Independence.

Harrow and seed drill: Underwood, Grand River.

Harrow, drill, grass seeder, and roller: Long, Osage.

Land roller (3): Cole, Fredericksburgh; French, Crawfordsville; Tompkins & Dougal, Van Buren.

Stalk cutters (12): Flack, Columbus City; Gordon, Washington; Kuh, Jefferson; Leslie, Ft. Madison; Lewis & Munger, Malcolm; Miller, Stanwood; Nebergall, Tipton; Ryder, Wapello; Wilde, Washington; Wilde & Wilde, Washington; Wood, Pella; Wright, Ft. Madison.

Plows

Plows (ditching, gang, garden, hand, sulky, mole, etc.) (59): Bagley, Tipton; Ballard & McClure, Mt. Pleasant; Blanchard, Iowa Falls; Bond, Marshalltown; Canfield (2), Lyons; Clifton, Lyons; Cummins, Leon; Cummings & Childs, Boonesborough; Donaldson, Toledo; Edgell, Alexander & Alexander, Independence; Fox, Oskaloosa; Freeman, Bloomfield; French & French, Keokuk; Furnas, Ononwa; Glass, McGregor; Hammer & Gordon, Lisbon; Hammitt & Miller, Toledo; Harris, Des Moines; Harrell, Clarinda; Hess, Lyons City; Hoit, Cedar Falls; Hunt (2), Muscatine; Ingalls, Independence; Karr, Mt. Pleasant; Knight, Boone; Kynett, Lisbon; Levee, West Point; Lyon, Harrisburgh; McConnell (2), Marengo; McCool (2), Guthrie Center; McWhinnery, Winterset; Miller, Mt. Pleasant; Miller, Sherman; Miller, Iowa Falls; Morrison, Ft. Madison; Morton, Oxford; Peters & Pauley, Keokuk; Pond, Independence; Primmer, Vinton; Rams, Keokuk; Rankin, Middletown; Rayl, Agency City; Reedy, Toledo; Romann & Peterka, Wilton Junction; Rhinehart & Gaston, Oskaloosa; Skinner, Davenport; Smith, Cedar Falls; Stafford, Burlington; Stephens, Agency City; St. John, Keosauqua; Von Achen, Bloomfield; Wilde, Washington; Wilson & Haworth, Iowa Falls; Wing, Earlville; Winton, Marion.

Plow colter: Gibson, Springfield.

Plow moldboard: Gaines & Scott, Fairfield.

Plow point: Kniphals, Davenport.

Plow scraper: Leach, Camanche.

Plow shovel (3): Smith, Des Moines; Trowbridge, Waterloo; Wilcox, Maquoketa.

Plow wheel (6): Borland (2), Charleston; Bingham & Pond, Waterloo; Cochrane, Indianola; McCool, Guthrie Center; Stevens, Donnellson.

Planting the Crop

Grain drill (10): Blood & Uhrich, Independence; Bucknell, Decorah; Cormick, Independence; Edgell, Martin, Kellogg & Alexander, Quasqueton; Evans, Newton; Gould, Winterset; Ingalls, Independence; Pond, Independence; Rand, Dubuque; Smith, Unity.

Seeders (34): Baldwin & Aborn, Independence; Bates, Centre Point; Beal & Beal, Lester; Churchill, New Hartford; Clark, Castalia; Clark & Whitney, Independence; Cozad, Corydon; Culley, Jefferson; Deyo, Strawberry Point; Douner & Stuart, Monmouth Twp., Jackson Co.; Field, Keokuk; Harrah, Baldwin & Jones, Davenport; Hathaway, Independence; Ingalls, Independence; Lewis, Elkport; Lower, Albia; Lyle, Clarksville; Matlock, Augusta; McGlew, Des Moines; Melendy, Delhi; Miller, Stanwood; Miner, Chariton; Morehouse, Davenport; Morton & Spaulding, Des Moines; Notestein, Salem; Paddington, Springville; Pierce, New Providence; Rate, Woodbridge; Root, Keokuk; Sackett, Monticello; Tedford, Hartford; Todd, Quasqueton; Wilson, Winterset; Weitman, West Union.

Seeder and cultivator combined (18): Hall, Woodbridge; Doud, Ward's Corner; Hyer & Hudson, Iowa Falls; Ingalls, Independence; Johnson, DeWitt; Kellogg, Quasqueton; Kint, Hazleton; Long (2), Osage; Mott, Postville; Pond (3), Independence; Smith (2), Independence; Stouder, Clarinda; Whait & Whait, Independence; Woodward, Des Moines.

Seeder and harrow combined (2): Fairchild, Independence; Gray, Chariton.

Seeder and stalk cutter combined: Grant, Mt. Pleasant.

Planter, corn (46): Ackerman, Steamboat Rock; Adams, Birmingham; Barger & Barger, Border Plains; Bond, Marshalltown; Brent,

Muscatine; Busch, Brooklyn; Corbit, Bethlehem; Davis (2), Bloomfield; Dutcher, Blue Grass; Floyd, Bloomfield; Greely, Summit; Hines, Independence; Jeffcoat, Onawa; Howell, Independence; Humphreys, Oskaloosa; Maple, Chariton; Morris & Harrison, Maquoketa; Myers, Onawa; Nemmers, St. Donatus; Orr, Morning Sun; Paddington, Wau-beck; Parsons, Charles City; Pelham, Kirkville; Pierson, Macy & Moore, Grinnell; Porter, Hopkinton; Raines, Fremont; Rich, New Providence; Rider, Wilton Junction; Russell & Burdick, Mill Rock; Ryder, Wapello; Smith, Montrose; Stark, Nevada; Stark & Mitchell, Nevada; Stoddard, Muscatine; Stone & Archibald, Wapello; Study, Plum Hollow; Todd, Mechanicsville; Wallis & Wallis, Milton; Warfield, Muscatine; Waterman, Keokuk; Westerfield, Ft. Dodge; Whitaker, Davenport; Woolsey, Bloomfield; Wyeth, Bloomfield.

Planter, hedge: Tucker, Albia.

Planter, seed (8): Atwood, New Sharon; Baker, Hopkinton; Chrisman & Whitmer, Sugar Creek; Garretson, Clay; Harrah & Baldwin, Davenport; Lee, Camanche; Lewis, Elkader; Mills, Bloomfield.

Planter, walking: Earlywine, Centerville.

Planter, marking attachment for: Sawyer, Madison.

Planter, corn and cane: Fate, Boonesborough.

Planter and cultivator combined (2): Earlywine, Centerville; Sterrett & Reynolds, Ottumwa.

Planter and plow combined: McIsaac, Waterloo.

Planter markers (5): Corbitt, Des Moines; Dickle & Cowan, Ottumwa; Goltry, LaGrange; Johnson, Decorah; McKinley, Chariton.

Cultivating the Crop

Cultivators (111): Ament (2), Muscatine; Baltimore, Marble Rock; Bankson, Mt. Pleasant; Baum, Oxford; Baumann, Muscatine; Bird, Ackley; Blood, Hathaway & Beach (2), Independence; Blue, Winfield; Bohan, New Hartford; Botten, Oskaloosa; Canfield, Lyons City; Canfield, Sabula; Canfield & Hess, Washington & Lyons; Cass, Muscatine; Chapman, Cedar Rapids; Chapman, Newton; Churchill, New Hartford; Clark, Bloomfield; Cogswell, Maquoketa; Conley, Moingona; Conner & Conner, Troy; Copeland, Quasqueton; Cowan, Bloomfield; Culver, Gilbertsville; Cummings, Boonesborough; Davis, Bloomfield; Dawdy, Hamburg; Dodge, Adel; Doud, Forestville; Doud, Ward's Corner; Doyle (2), Waterloo; Earlywine, Centerville; Er-

ickson, Swede Bend; Fanning & Legler, Burlington; Frank (2), Webster City; Furnas & Furnas, Ononwa; Furnas, Ononwa; Gillespie, Burlington; Given, Hutsonmiller & Gilbert, Des Moines; Grant, Mt. Pleasant; Gross, Manilla; Harper, Salem; Harper, Hillsborough; Harvey, Volga City; Herman, Mt. Vernon; Herrick, Grinnell; Jenkins, Cottonville; Johnson, Maquoketa; King, Princeton; Kynett, Lisbon; Leffler, Highland Twp., Washington Co.; Lynch (2), Davenport; Lynch & Raff, Davenport; Marinus, Independence; McClintock, Glenwood; McCormick, Muscatine; McDermott, Ogden; McDonald, Nevada; McGlew, Des Moines; Mead & Stevenson, Denmark; Mills, Bloomfield; Mills, Des Moines; Moody, Montezuma; Morgan (2), Delhi; Neisler, Indianola; Norton, Prairie City; Parmele (2), Davenport; Paul, DeWitt; Perry, Muscatine; Poling, Guthrie; Pond, Independence; Potter, Fairfield; Rate, Tipton; Rayl, Agency City; Reynerson (2), Pleasant Plain; Rider, Wilton Junction; Roberts, Lyons; Robeson & Nash, Oskaloosa; Rockafellow, Muscatine; Sanders, Davenport; Sawyers, Orleans; Sawyers, West Grove; Sexton (3), Pella; Smith, Des Moines; Smith, Springdale; Smook, Nine Eagles; Stillwell, Fayette; Stover, Sandyville; Strickland, Talleyrand; Tietjens, Lyons; Tilden, Davenport; Thompson, Ottumwa; Wells, Lyons; Whait & Whait, Independence; Wilde, Washington; Wiles & Ginnes, Muscatine; Wilhelm, Muscatine; Wilcox, Delhi; Wilson, Hamburg; Witter, Sherrill's Mount.

Cultivator wheel: Earlywine, Centerville.

Harvesting the Crop

Corn husker (6): Briggs, Fayette; Hall (2), Woodbridge; Petersen, Davenport; Pond, Independence; Warren, Des Moines.

Corn sheller (5): Gould, Grinnell; Johnson, Marshall; Ketchum, Marshalltown; Kilgore, Washington; Seymour, Cedar Rapids.

Grain binder (14): Bull, Buckingham; Clinton (2), Iowa City; Harrah, Davenport; Harrah, Gifford & Johnston, Davenport; Hemperly & Barnes, West Liberty; Lottridge (2), Charles City; Mudgett, Camanche; Parker (2), Davenport; Ross, Bowen's Prairie; Warner, West Liberty; Youll, Manchester.

Grain cleaner and dryer (4): Booth, Dubuque; Overton, Knoxville; Sternberg, Webster City; Williams, Ottumwa.

Grain distributor: Haradon, Independence.

Grain riddle: Rowe, Atalissa.

Grain separator (15): Bates, Hardin; Chamberlain, Dubuque; Cox, Delhi; Custer, Bonaparte; Dunham, Fayette; Fergusson (2), Dubuque; Gaunt & Hinman, Keokuk; Kathan, Hardin; Lull, Hardin; Parmater & Bowen, Vinton; Rowe, Atalissa; Sylvester, Dubuque; Thomas, Cascade; Wells, Oskaloosa.

Grain weighers (10): Armes, Decorah; Brockett, Davenport; Burke, Grundy Center; Hill, Jefferson; Hines, Brown, Saterlee & Harden, Quasqueton; Howard, Belle Plaine; Stinson, New Bern; Taylor, Burlington; Widger & Reed, Fairfield; Wiley, Clayton.

Harvesters (35): Bailey, Wiscotta; Beele, Independence; Boyd, Des Moines; Bradley, Cedar Falls; Carrother & Carrother (2), Newton; Clinton, Iowa City; Clinton, Prather & Hutchison, Iowa City; Crossland, Spencer Grove; Emery, Cedar Falls; Field, Keokuk; Hamilton, Panora; Holt & Laflin, Cedar Falls; Holmes, Council Bluffs; Hospers, Pella, and Sellers, Keokuk; Kellar & Kellar, Buckeye; Kilgore, Washington; King, Salem; Knapp, Dubuque; Lyman (2), Independence; McCafferty, Waterloo; Mertz, Burlington; Parker, Davenport; Pressey, Dubuque; Risher, Oskaloosa; Rockafellow, Muscatine; Rurve, Walcott; Thorp, Waterloo; Wallis & Miller, Milton; Wheeler, Keokuk; Yates, Dubuque; Zimmerman, Oskaloosa.

Harvester attachments (binder, binder's table, dropper, etc.) (19): Barns, West Liberty; Beels, Independence; Bishop, Batavia; Chapman, Iowa Falls; Dixon & Sampson, Eddyville; Fowler (2), Davenport; Goddard (2), St. Ansgar; Harrah & Jones, Davenport; Harvey, Marshalltown; Jones, Clarksville; Ketchum (2), Marshalltown; Mitchell, Osceola; Price, Amana; Sharp & McClurg, Tama City; Shults, Waverly; Smith, Orford.

Harvester-rake (13): Barns, Oskaloosa; Buckwalter, Davenport; Crane & Johnston, Ottumwa; Fowler, Davenport; French, Independence; Glass & Glass, McGregor; Heuermann, Sternberg & Stuhr, Davenport; Irvine, Parkersburgh; Mendenhall, Fairfield; Reister, Washington; Rodman, Lyons; Stewart, Ft. Madison; Underwood, Muscatine.

Hay loading and unloading (18): Angell, Clermont; Barber, Camanche; Denton (2), Iowa City; Fell & Mattock, Maquoketa; Gower, Lime Spring Station; Jewett, Sand Spring, & Bowen, Bowen's Prairie; Lewis & Durbin, Iowa City; Long, Delaware Center; Loudon, Fairfield; Parker, Buffalo Grove; Purviance, Keosauqua; Sehorn, Iowa City; Toof, Ft. Madison; Terrell, Oskaloosa; White, Columbus City; Zimmerman, Colfax.

Hay rack (3): Condra, Genoa; Denis & Grassel, Osceola; Downing, Mitchell.

Hay rake (5): Brown, Ononwa; Crellin, Marshalltown; Long, Eddyville; Morris, Maquoketa; Skunk, Des Moines.

Hay rake and loader (5): Armstrong & Jeffcoat, Onawa; Elarton & Thomas, Hillsborough; Harper, Hillsborough; Lewis, Durbin & Lewis, Iowa City; Reister, Washington.

Hay shockers and stackers (5): Louden (2), Fairfield; Plymate, Freeland; Terrell, Oskaloosa; Wallace, Keokuk.

Horse rake (5): Davis, Ft. Madison; Kayso & Kayso, Independence; Marlin, West Liberty; Sherman, Ft. Dodge; Toof, Ft. Madison.

Potato digger (7): Cannon, Keokuk; Curtis, Des Moines; Hoag, Muscatine; Ross, Washington; Sherwood, Ottumwa; Soules, Cresco; Wheeler, Mallory.

Power press, hay: Weed, Muscatine.

Reaping and mowing machine (2): Clark, Castalia; Hoit, Cedar Falls.

Sheaf band cutter (2): Haines, Farley; Young, Waverly.

Stacker, chaff and straw: Loomis, Fairfield.

Straw cutter (7): Hoit (2), Cedar Falls; Lundy, Marshalltown; Odell, Winterset; Park, Germanville; Parker, Winterset; Schreck, Des Moines.

Threshers, grain, and attachments (10): Averill, New Oregon; Carleton, Indianola; French, Washington; Kane, Tivoli; Murphy, Dubuque; Rentgen & Humes, Keokuk; Shearer, Drakesville; Sumner, Oskaloosa; Thompson, Horton; Workman, Fairfield.

Winnower, grain (3): Larrabee, Clermont; Shafer, Burlington; Thomas, Cascade.

Milling Grains

Fanning mills (9): Averill, New Oregon; Foster, Des Moines; Hutchins, Syracuse; Kane, Tivoli; Kelly & Franklin, Decorah; Littlefield, Lewis; Randell, Des Moines; Tush, Manchester; Wilcox, Chariton.

Feed mill: Myers, Lyons City.

Grain elevators and conveyors (4): Lemon, Polk City; Loudon, Fairfield; Lowden, Cedar Twp., Van Buren Co.; Rush, Marengo.

Grinding mill (4): Finch, Cedar Falls; LaPort, Clarinda; Replogle, Moulton; Sherwood, Independence.

Hominy mill: Fahrney, Deep River.

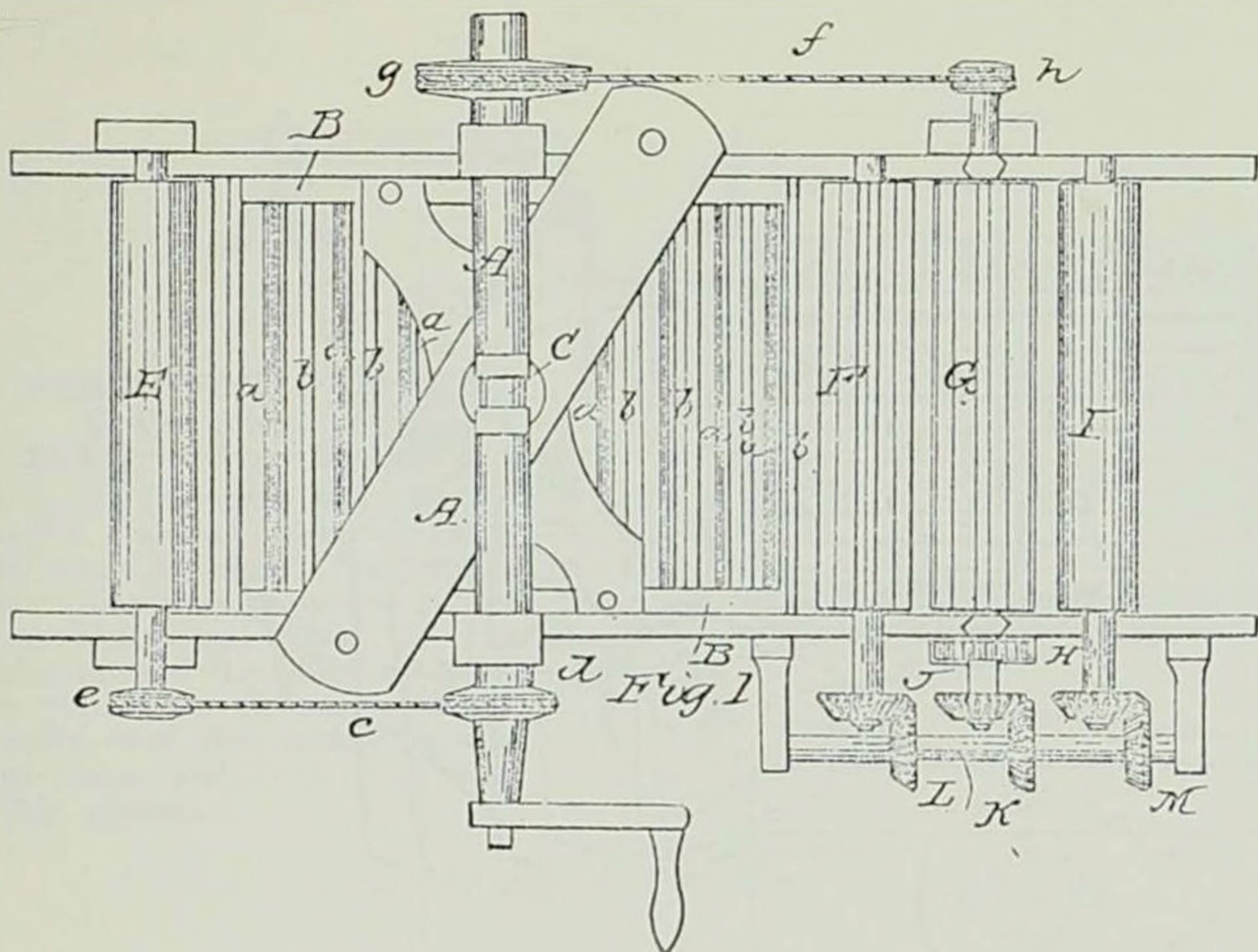
Maize, preparation of, for grinding: McCrosby, Monroe.

Mill bolts (4): Choat & Rich, Cedar Falls; Hanna, Keokuk; White (2), Des Moines.

Millstones, parts for (8): Dolsen, Waterloo; Gray, Dubuque; Heffner, Independence; Henderson & Henderson, Albia; Hurd, El Dorado; Rowe, Atalissa; Smith, Princeton; Wohlenberg, Lyons.

Steamer, grain (5): Ballard & Sargent, Mt. Pleasant; Hanna, Keokuk; Hunt (2), Sioux City; Lehmann, Columbus City.

Smut machine (6): Jordan, Burlington; Marshman & Foulke, Carlisle; Philips, Burlington; Thompson, East Davenport; Woodward (2), Burlington.



JOHN GODDEN, PITTSBURG

Hemp and Flax Brake

2,922 — Jan. 20, 1843

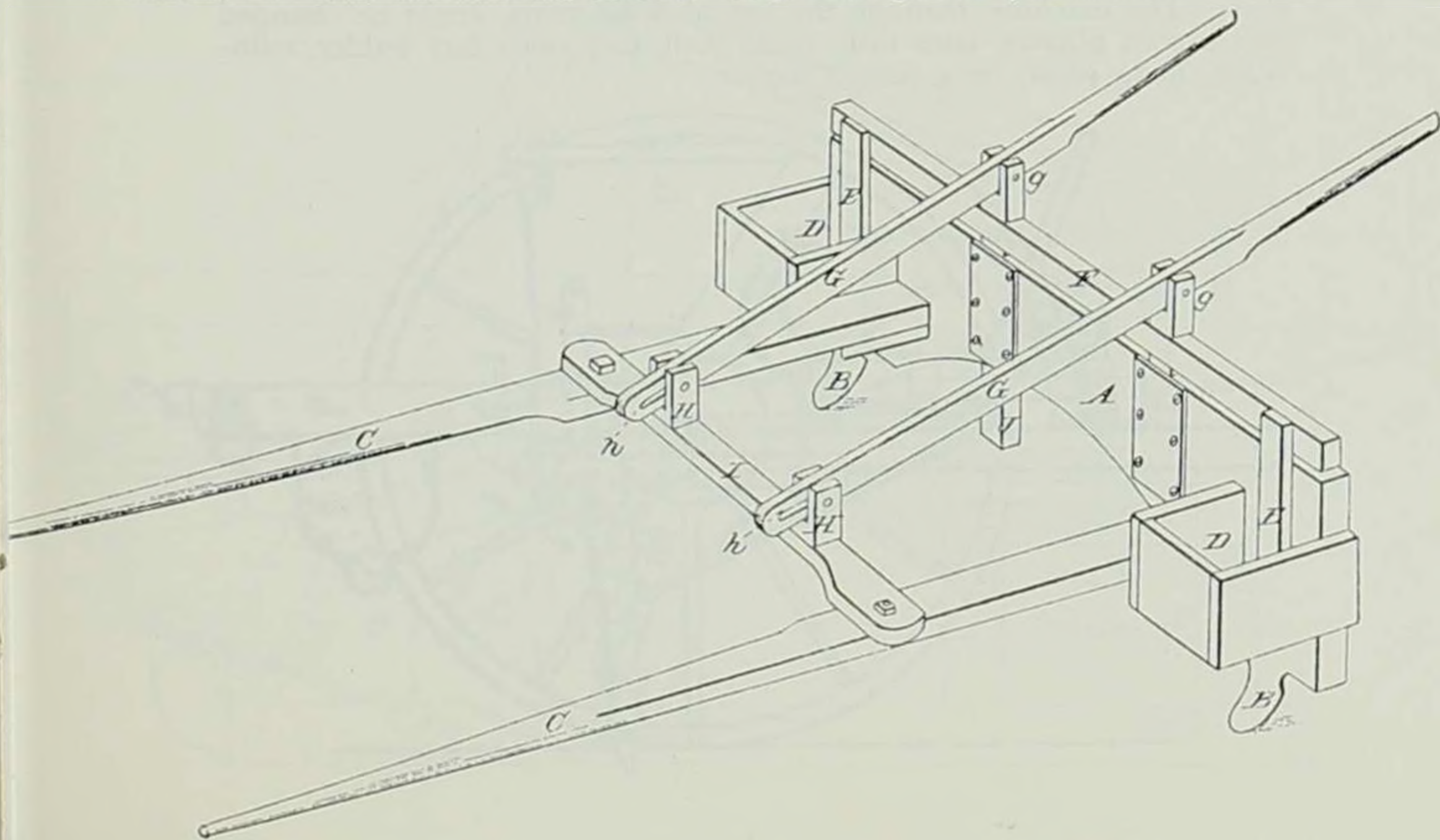
John Godden of Pittsburg, Van Buren County, received the first patent issued to an Iowan. Flax or hemp was fed through rollers, E, between the frames of slats, B and N, and then through the cleaning rollers, G. This is a top view of the machine. The addition of a second frame of slats, N, combined with the upper vibrating frame, B, was new.

ISAAC H. GARRETSON, CLAY

Seed Planter

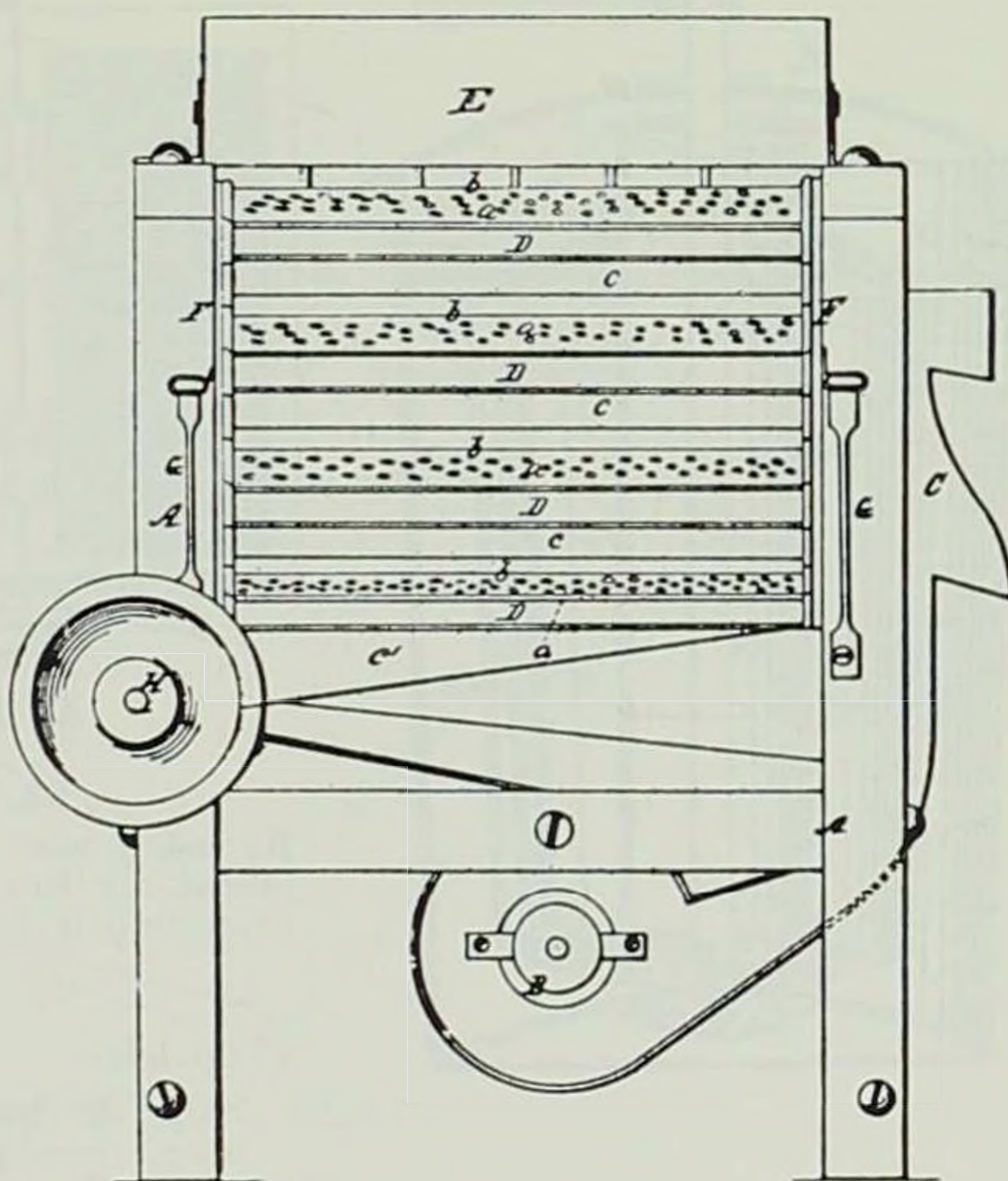
9,636 — Mar. 29, 1853

Isaac Garretson, Clay, invented this seed planter. In planting corn in check rows, the slides, E, were worked by hand by moving the crossbar, F. This allowed the corn to drop through the planter, B.



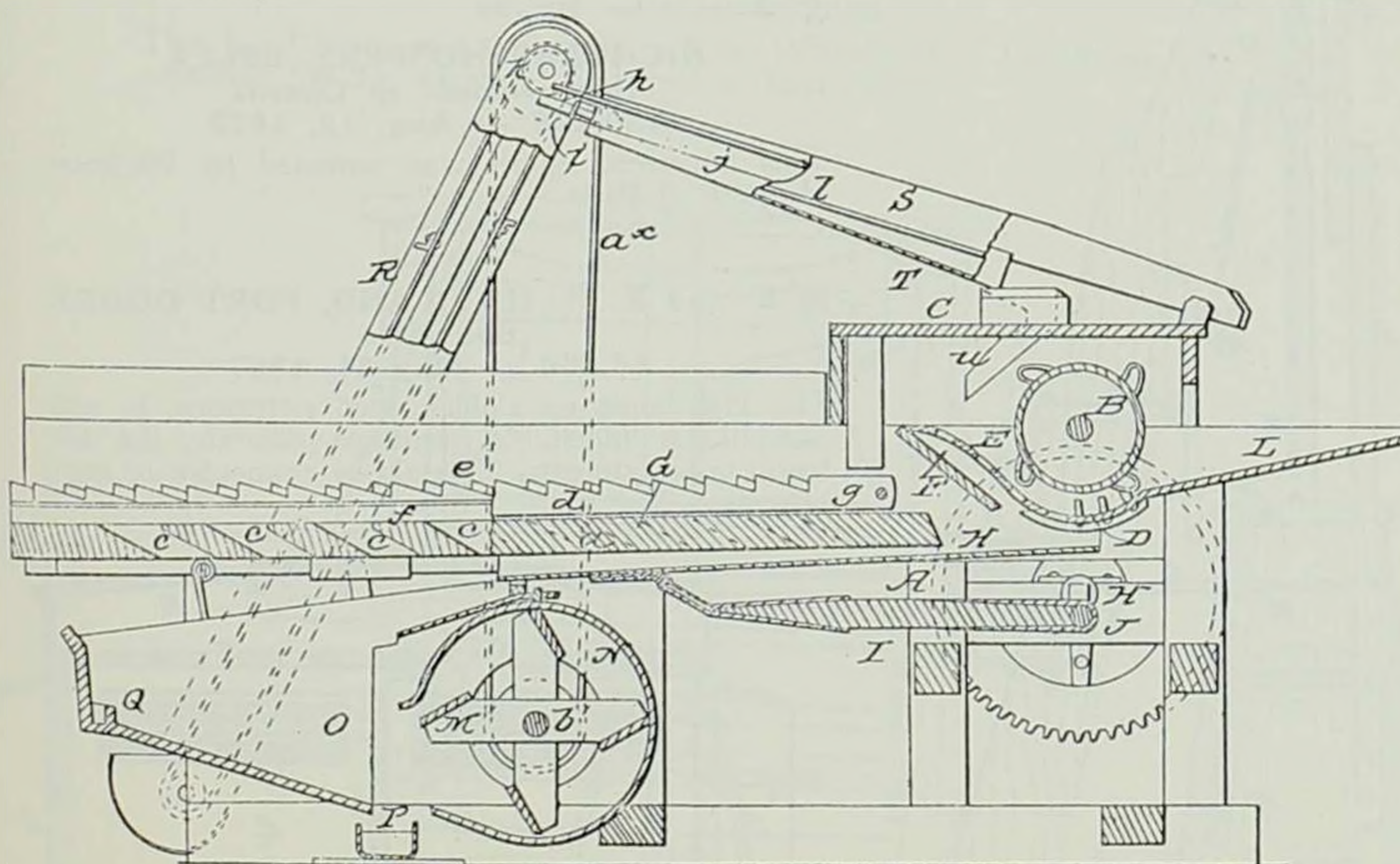
J. FARGUSSON, DUBUQUE
Grain Winnower
33,639 — Nov. 5, 1861

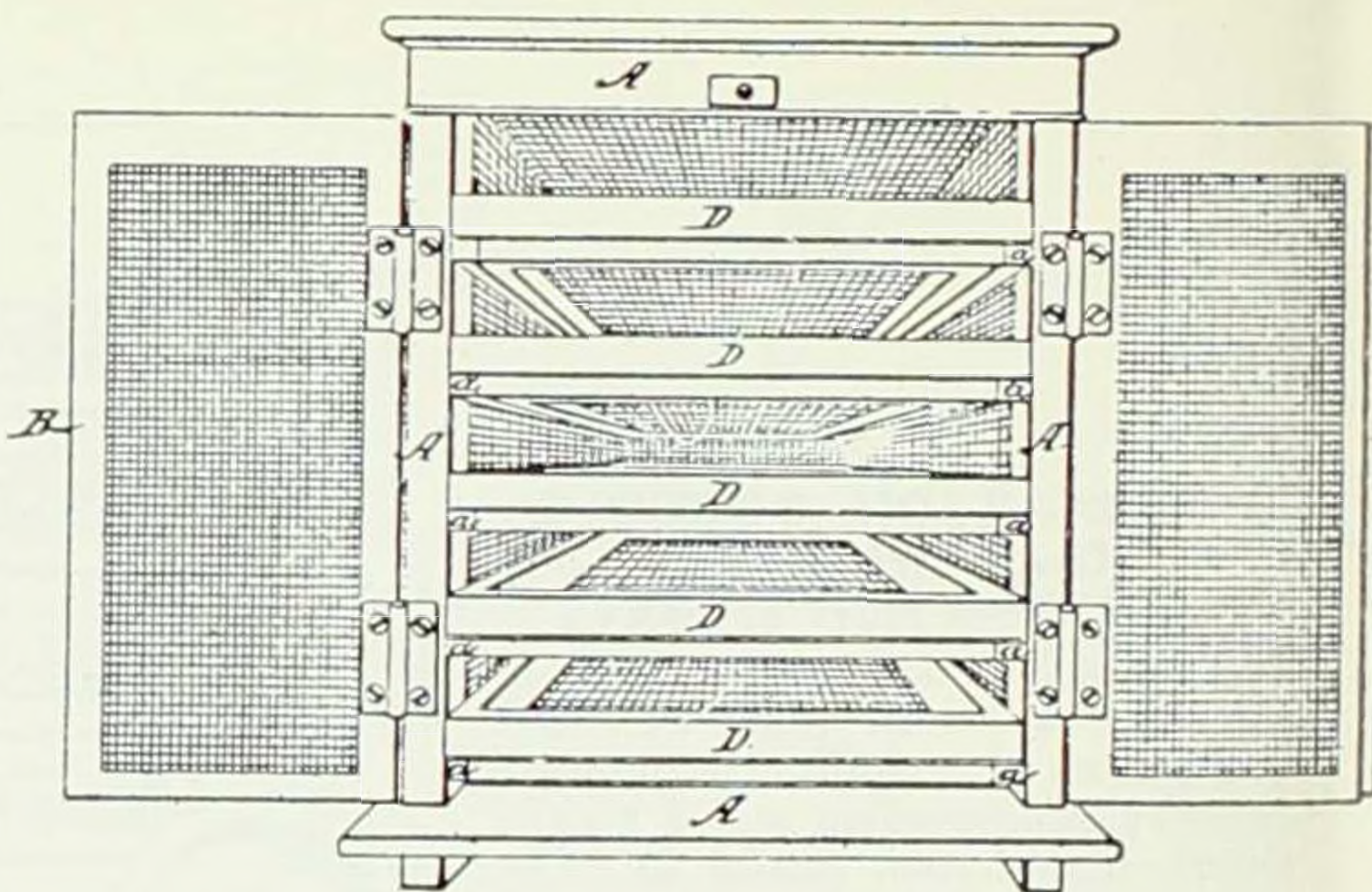
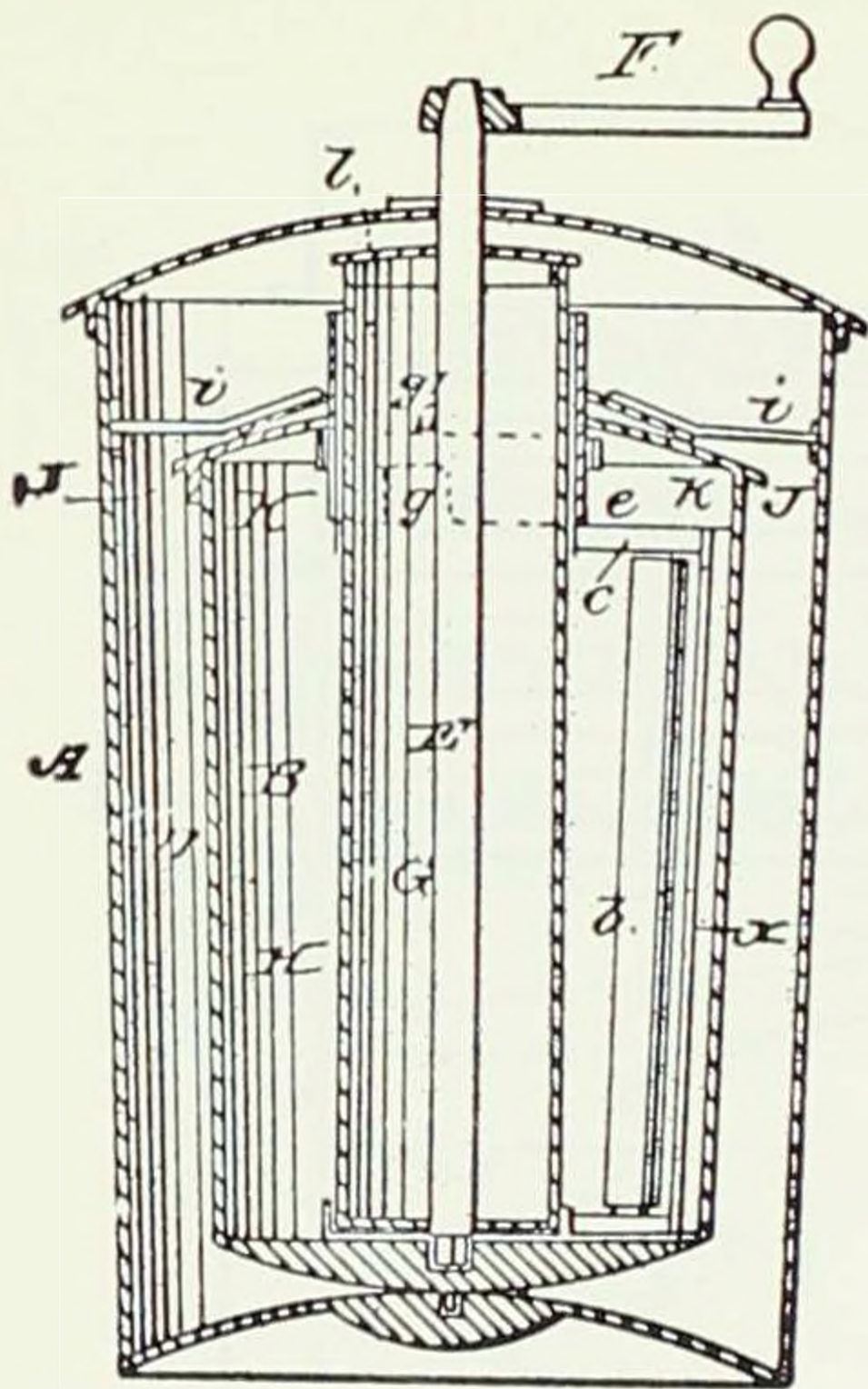
The grain winnower was used to separate or clean wheat or other grain from the chaff. Fergusson's primary improvement was a hollow rhomboidal-shaped riddle, D. The riddles divided the grain as it fell from the hopper, E, and diffused it laterally over two inclined perforated planes and so on until thoroughly cleaned.



D. H. SHEARER, DRAKESVILLE
Grain Thrasher
41,103 — Jan. 5, 1864

A grain thrasher was patented by D. H. Shearer of Drakesville, Davis County.





A. J. SMITH, DECORAH
Fruit Drier
92,113 — June 29, 1869

By using wire cloth in his fruit drier, Smith permitted the free flow of air to dry the fruit while protecting it from flies and other insects.

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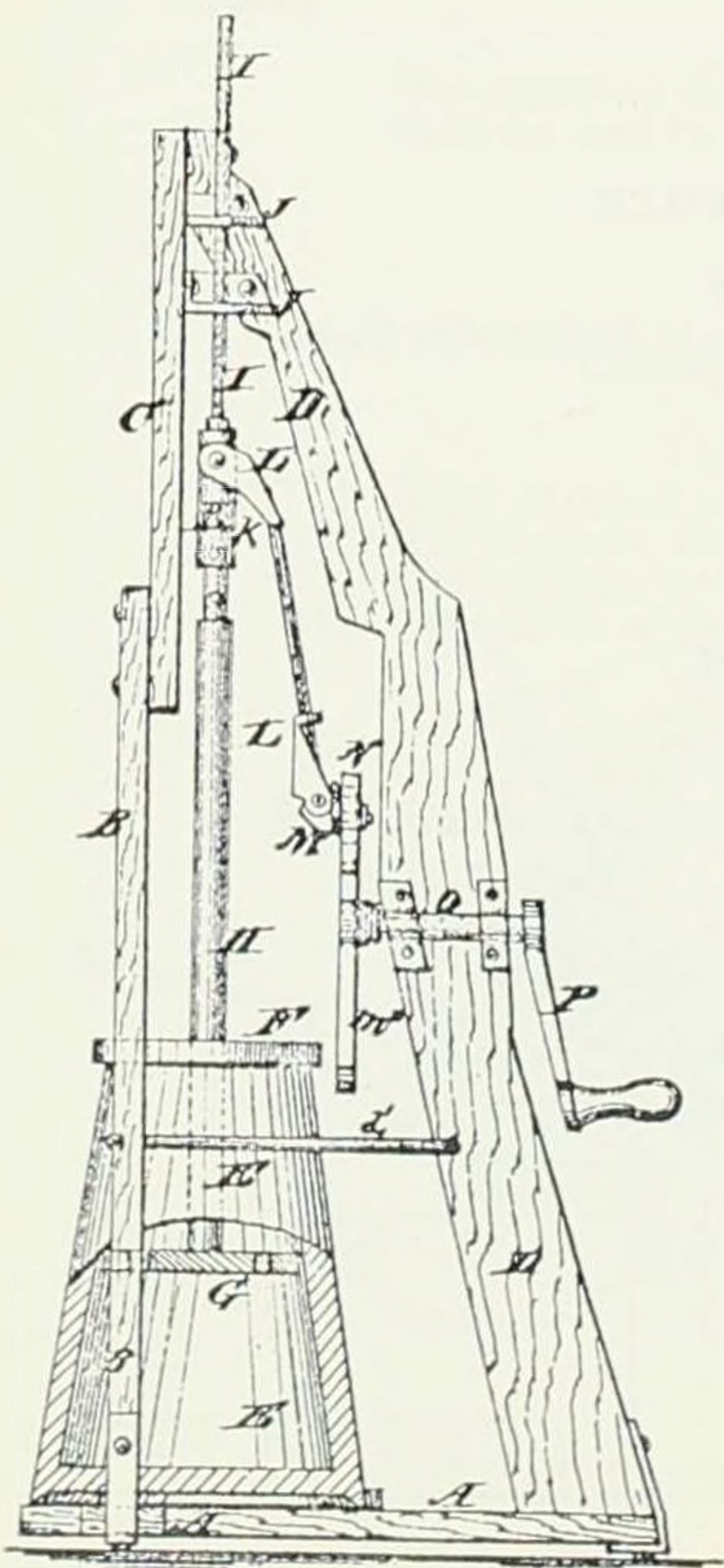
A. S. BALLARD, MT. PLEASANT
Ice Cream Freezer
85,420 — Dec. 29, 1868

Allen Ballard patented this ice cream freezer in 1868. It featured an inner and outer ice chamber and a chamber containing the milk which would be frozen between the ice chambers.

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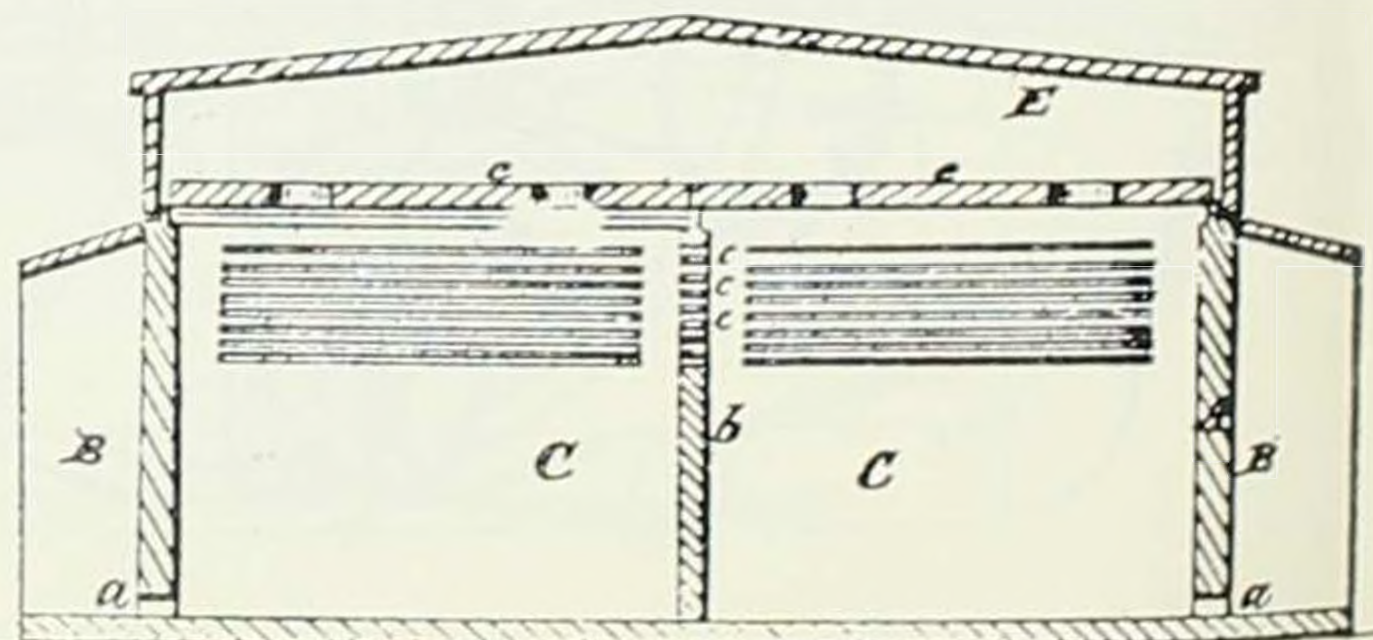
NICHOLAS HOSPERS, PELLA
Improvement in Churns
130,428 — Aug. 13, 1872

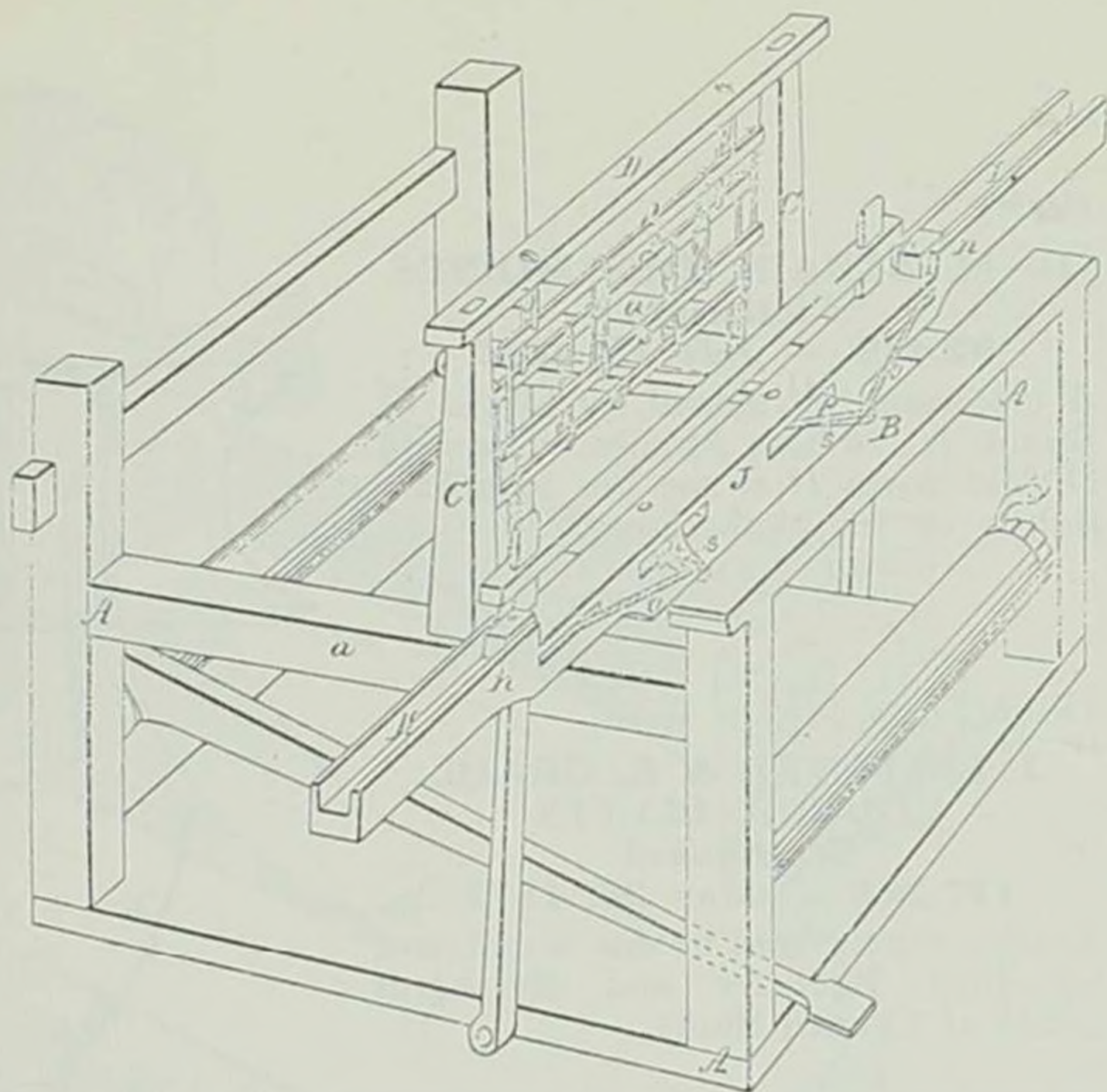
This improved churn was patented by Nicholas Hospers of Pella.



B. S. and E. H. HAVILAND, FORT DODGE
Bee Hive
64,864 — May 21, 1867

The Havilands used perforated partitions, *b*, and movable or adjustable partitions, whereby the different compartments, *C*, could be connected or kept separate.



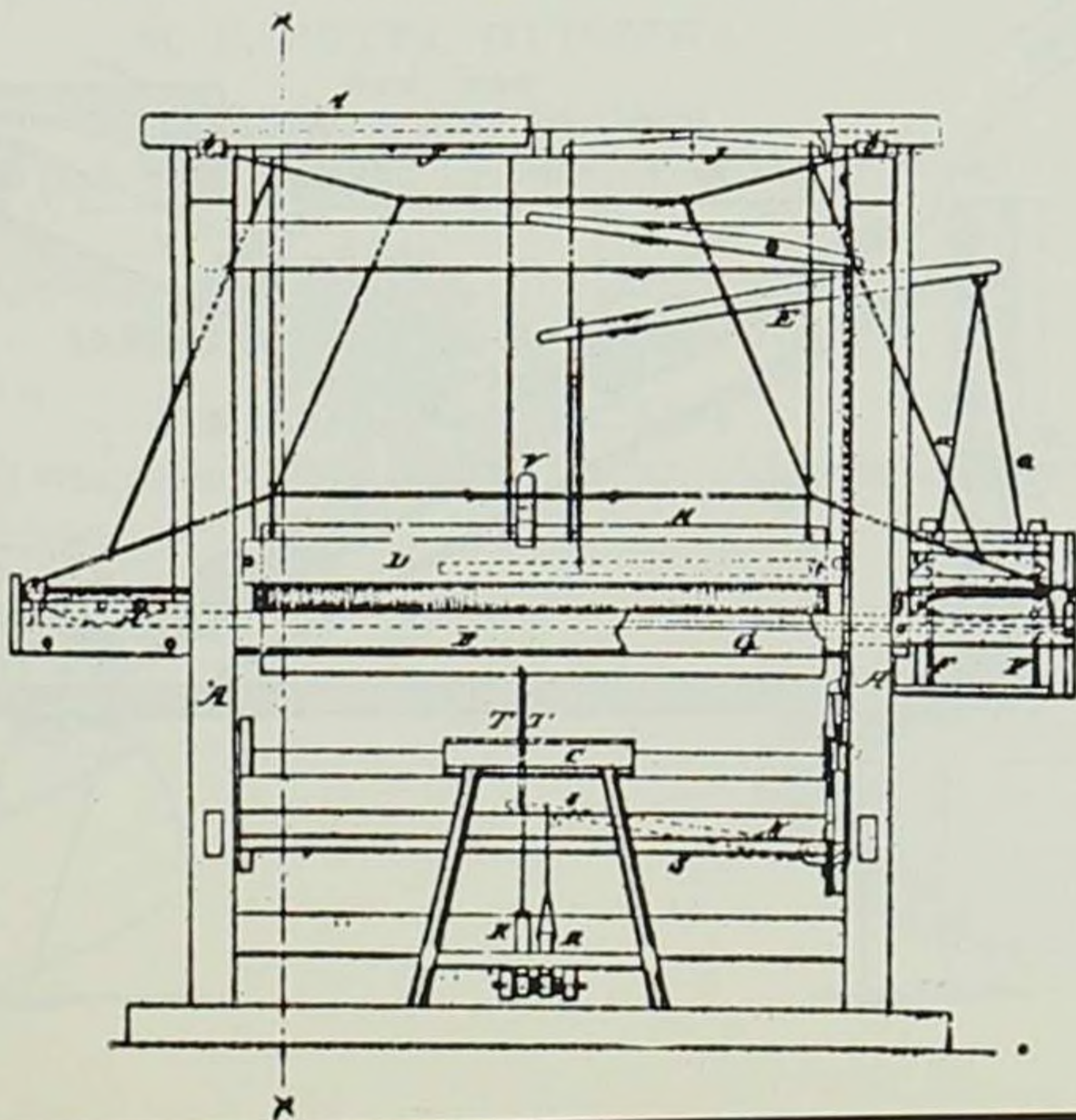


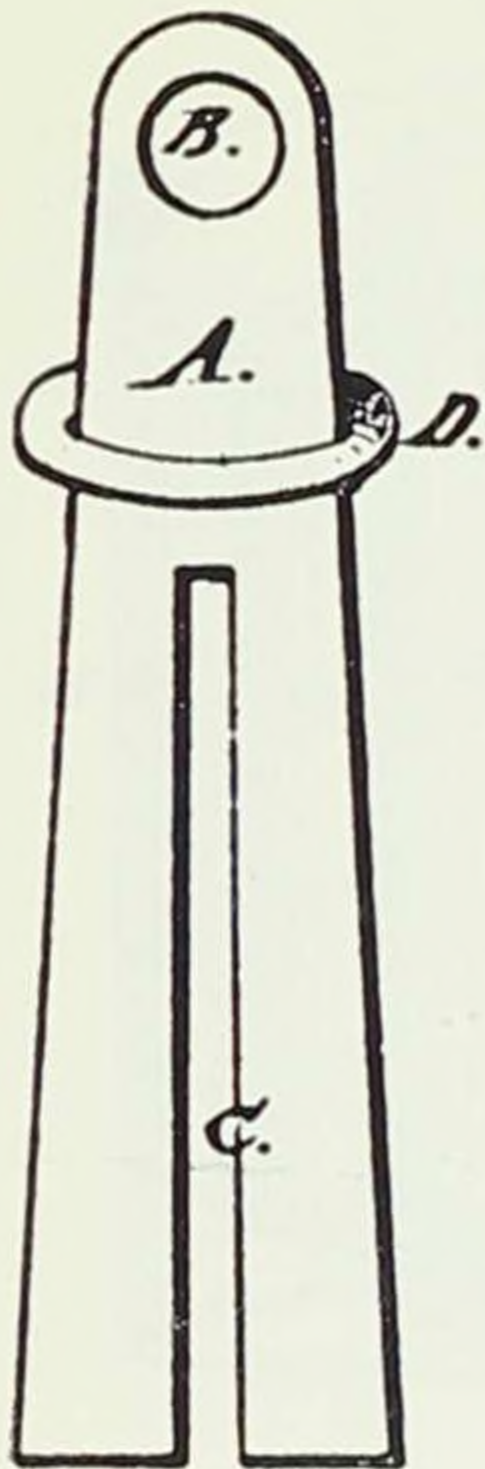
I. H. GARRETSON, CLAY
Hand Loom
7,936 — Feb. 18, 1851

This hand loom was another invention that was patented by Isaac H. Garretson of Clay.

JOHN WHITEHEAD, OSKALOOSA
Hand Loom
60,305 — Dec. 4, 1866

This hand loom was invented by John Whitehead of Oskaloosa. It provided for the weaving of striped or fancy cloth.



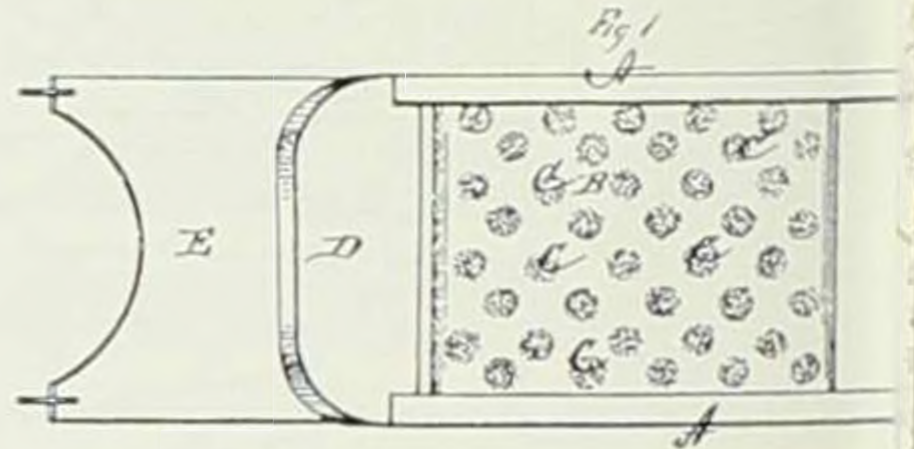


(Left)

D. M. STRAIN, DES MOINES
Clothespin

92,488 — July 13, 1869

A clothespin developed by David M. Strain, Jr., of Des Moines. The ring, D, slid down over the pin to hold it tightly on the clothesline.



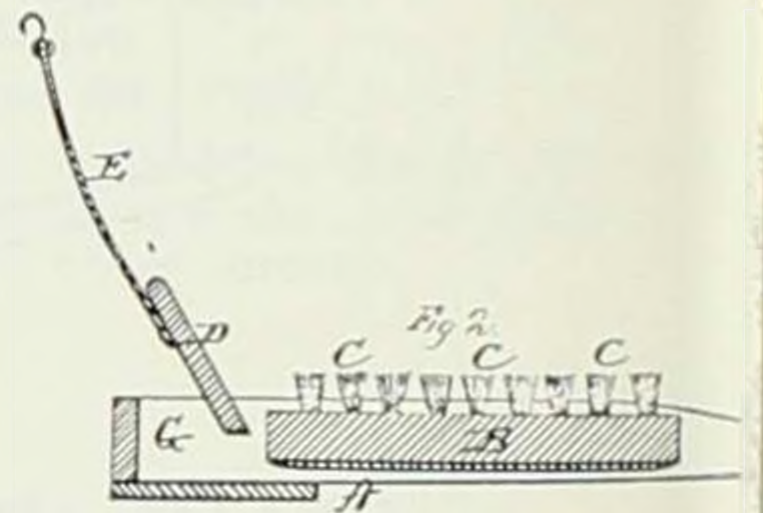
(Right)

J. EPEETER & B. GRAHL
COUNCIL BLUFFS

Washboard

127,325 — May 28, 1872

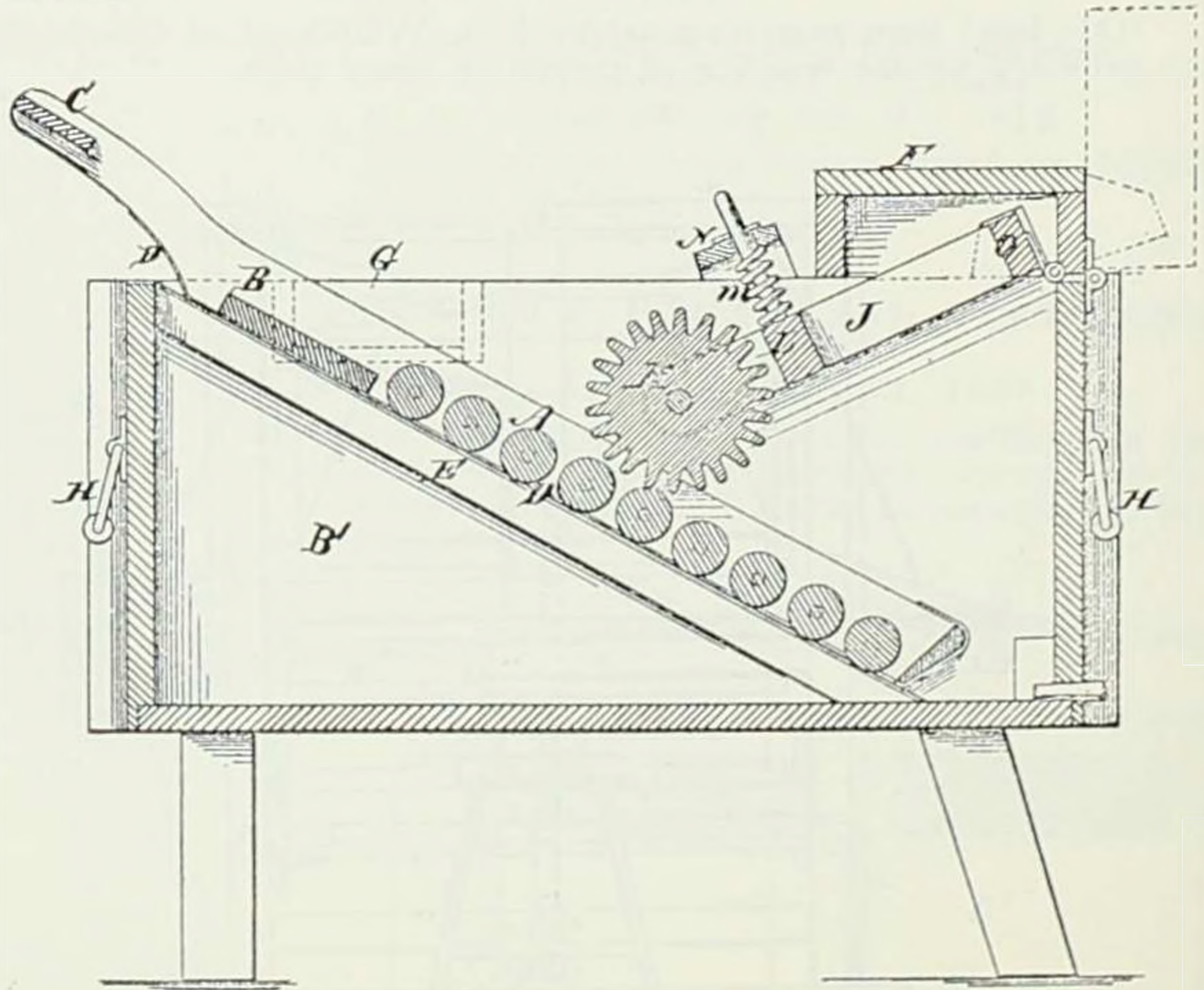
Bristles were added to this washboard by John Epeneter and Bernhardt Grahl of Council Bluffs.

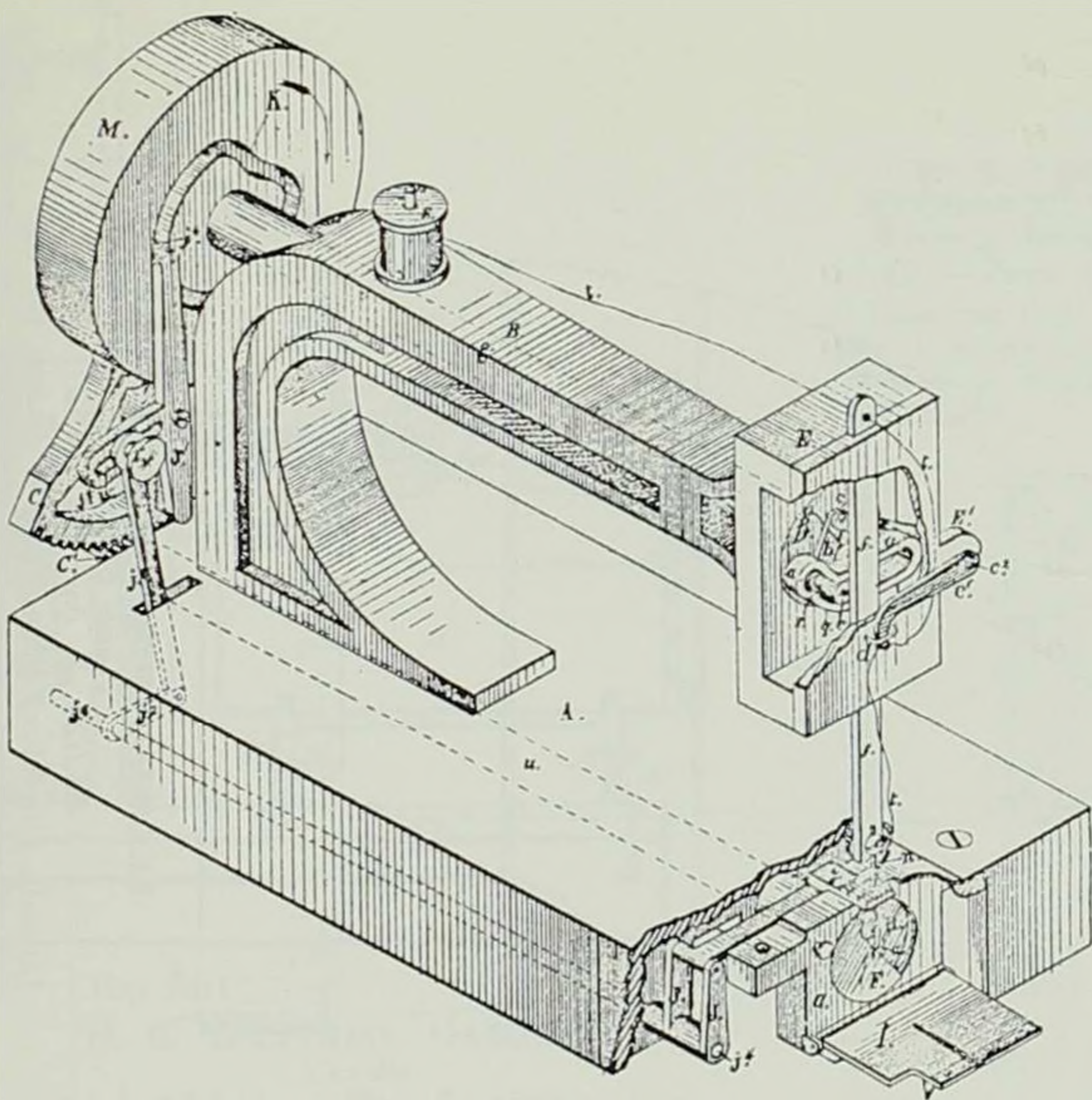


SILAS STREATOR, SMITHLAND
Washing Machine

129,184 — July 16, 1872

Silas Streator received his patent for an improvement in the washing machine.





D. H. ROGAN, NEWTON
Sewing Machine
137,321 — Apr. 1, 1873

A sewing machine attachment was patented by Daniel H. Rogan of Newton.

(Bottom left)

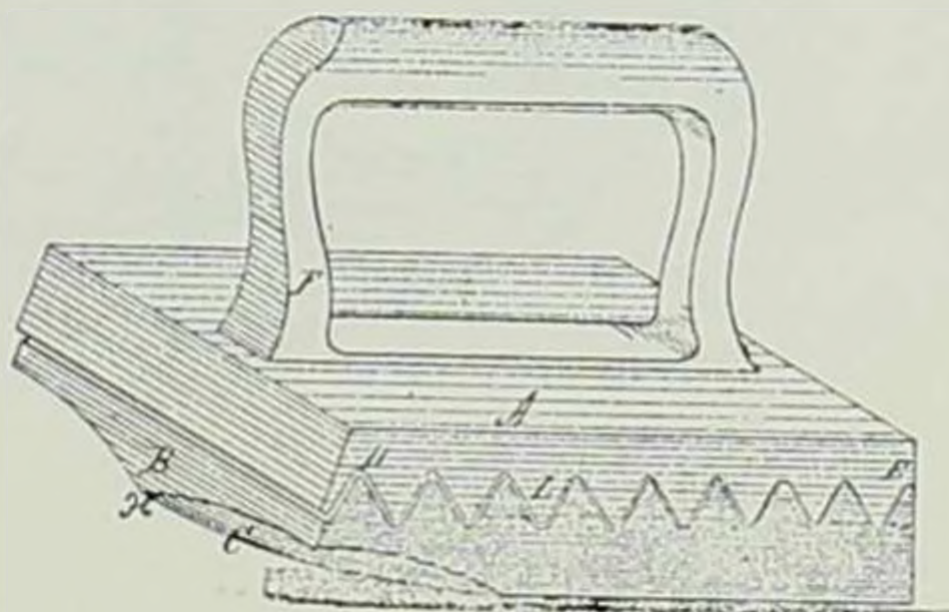
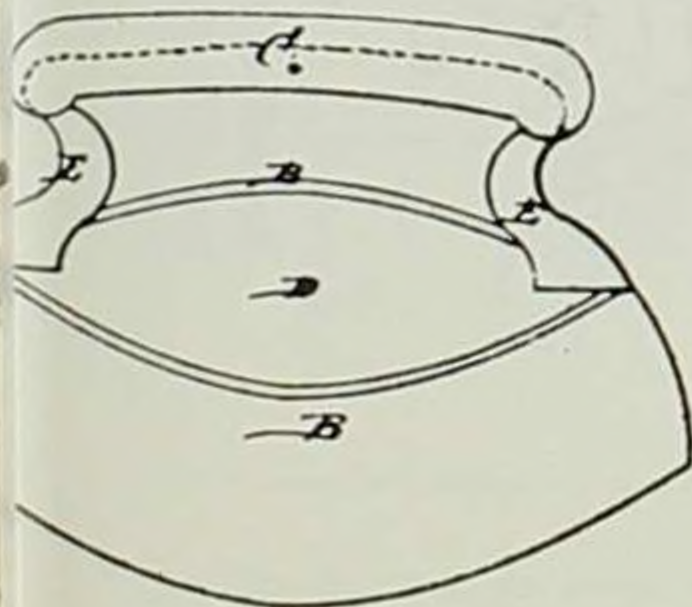
M. F. POTTS, OTTUMWA
Sad Iron
103,501 — May 24, 1870

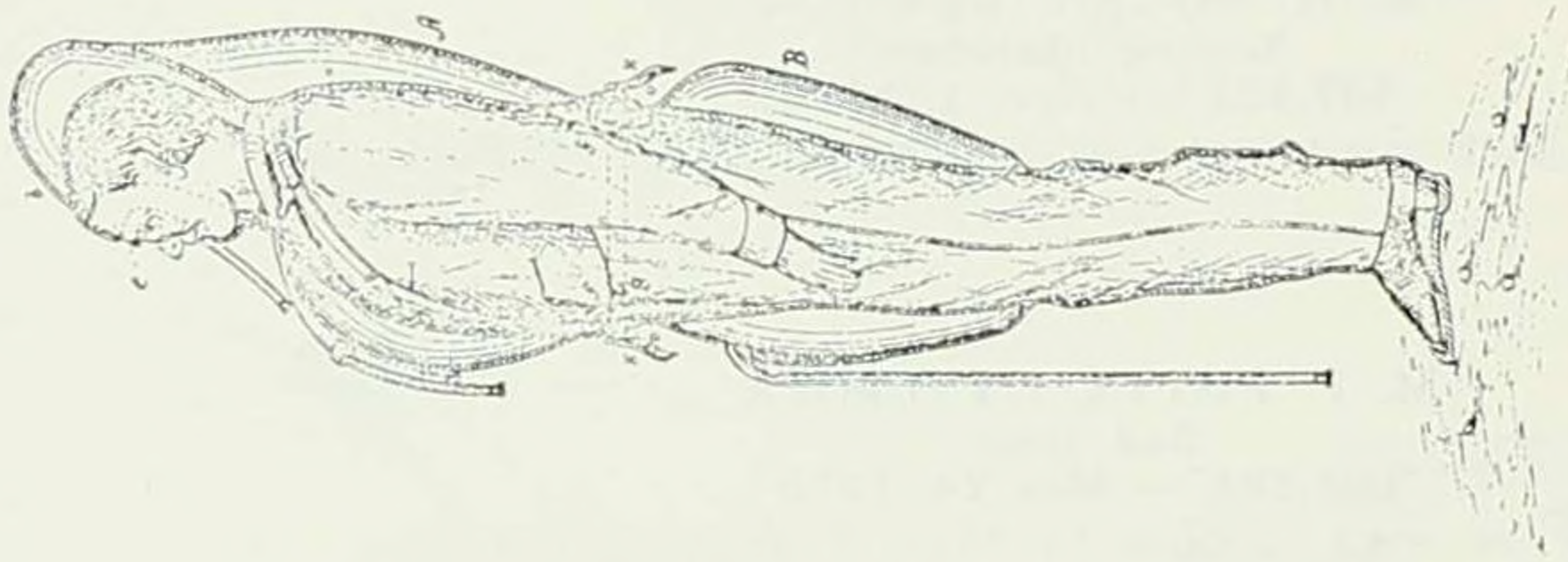
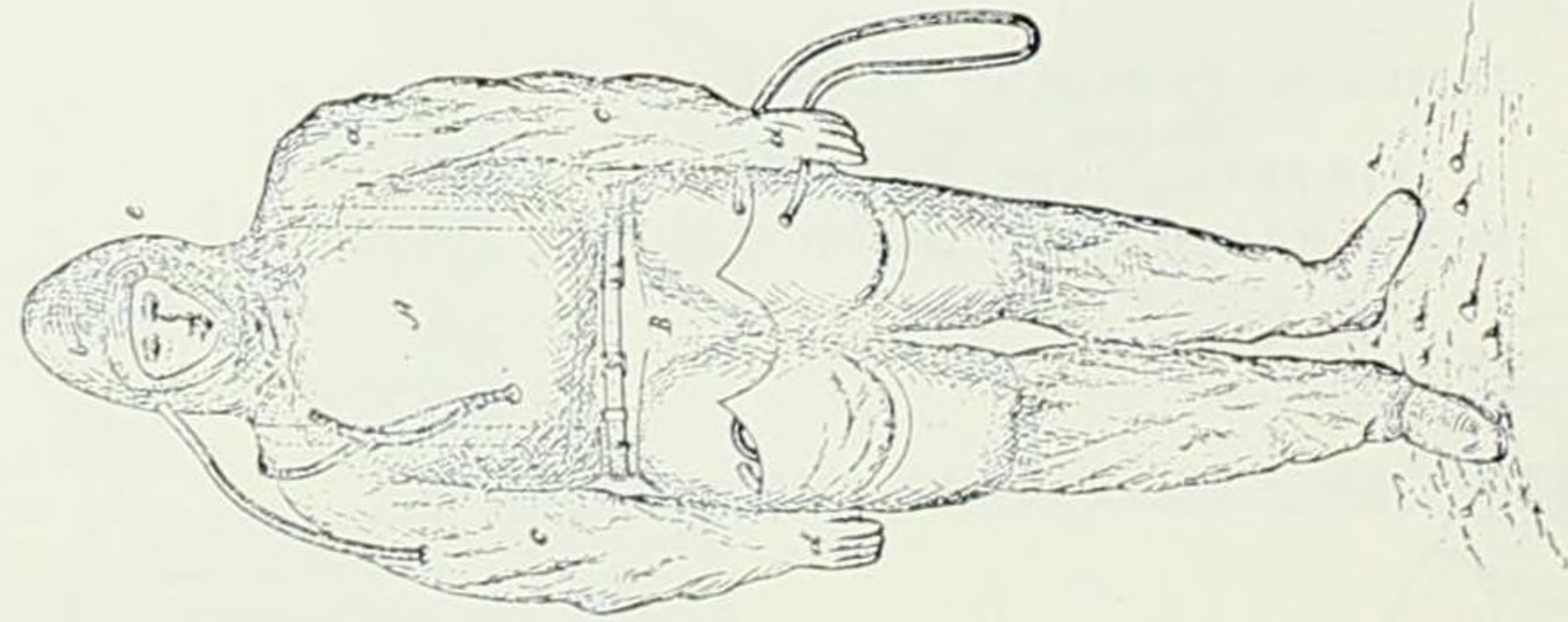
One of the sad irons patented by Mary F. Potts of Ottumwa.

(Bottom right)

JAMES K. GULIHUR, MONTANA
Fluting Iron
118,854 — Sept. 12, 1871

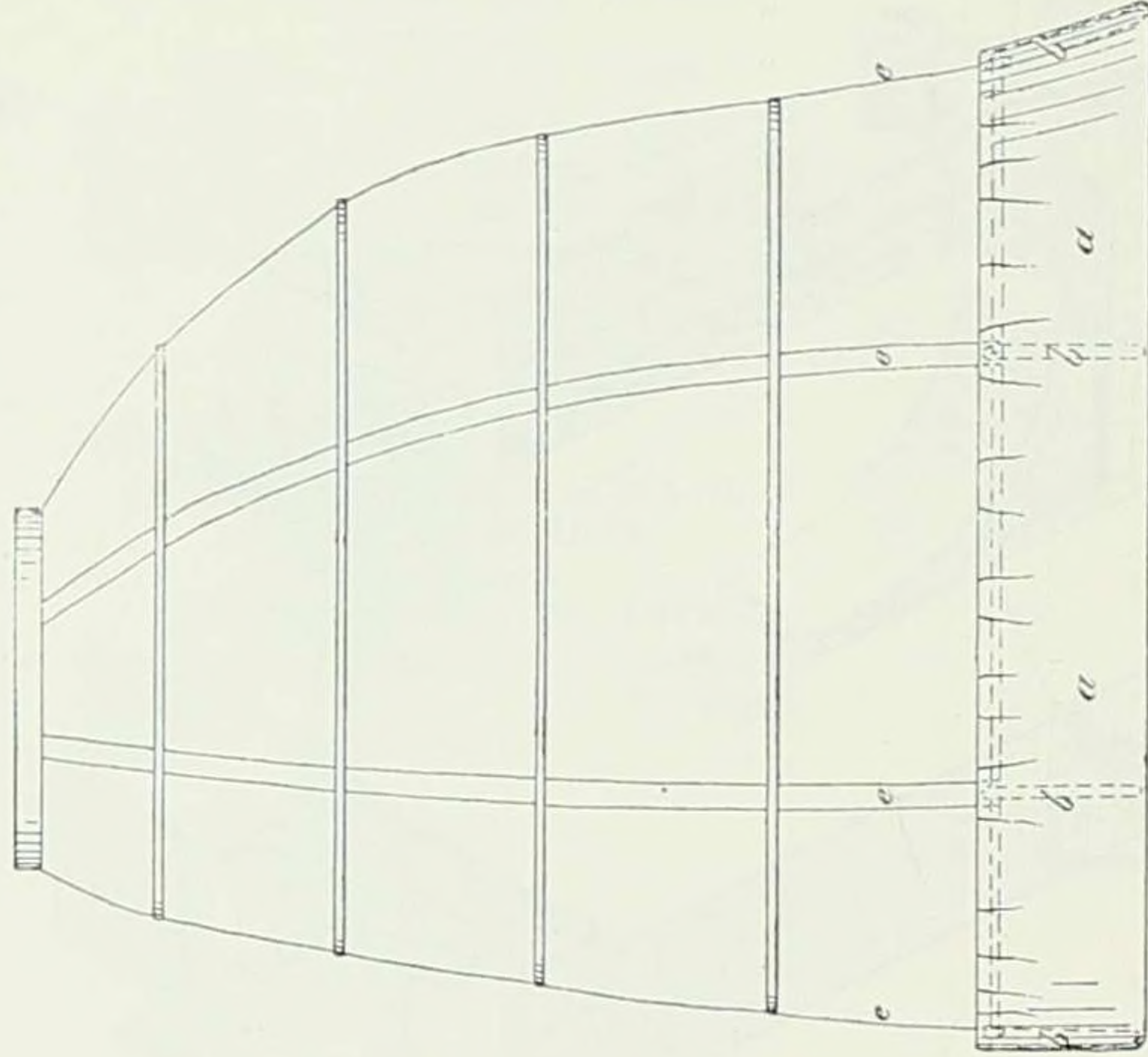
A fluting iron was patented by James K. Gulihur of Montana (Boone).





C. S. MERRIMAN, VILLISCA
Life Preserving Dress
128,971 — July 16, 1872

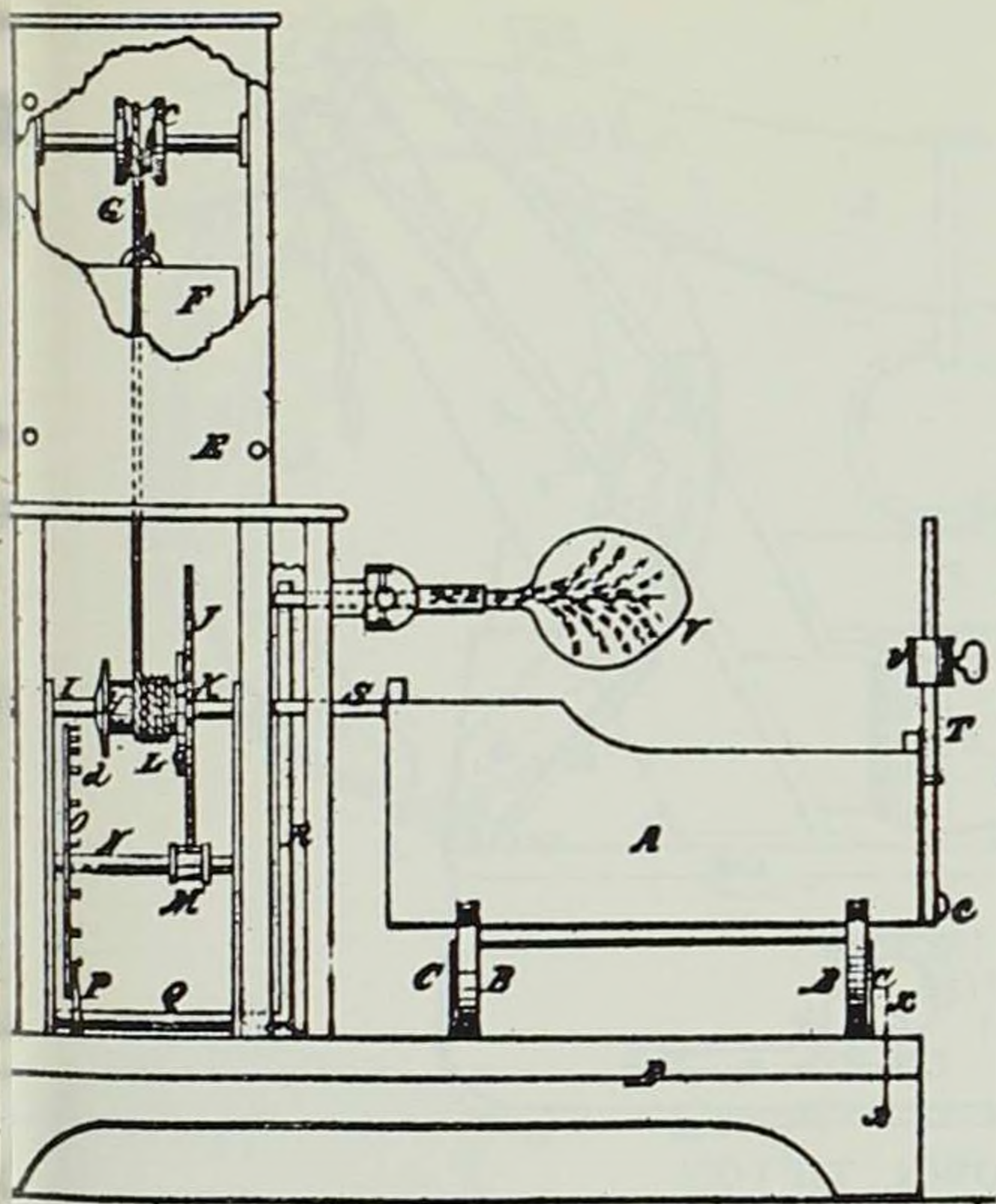
An inflatable dress to prevent people from drowning was patented by Clark S. Merriman of Villisca.



LUCINDA HUMPHREY, TIPTON
Hoop Skirt

35,026 — Apr. 22, 1862

Lucinda Humphrey's idea was to protect the bottom of skirts and dresses in wet weather.



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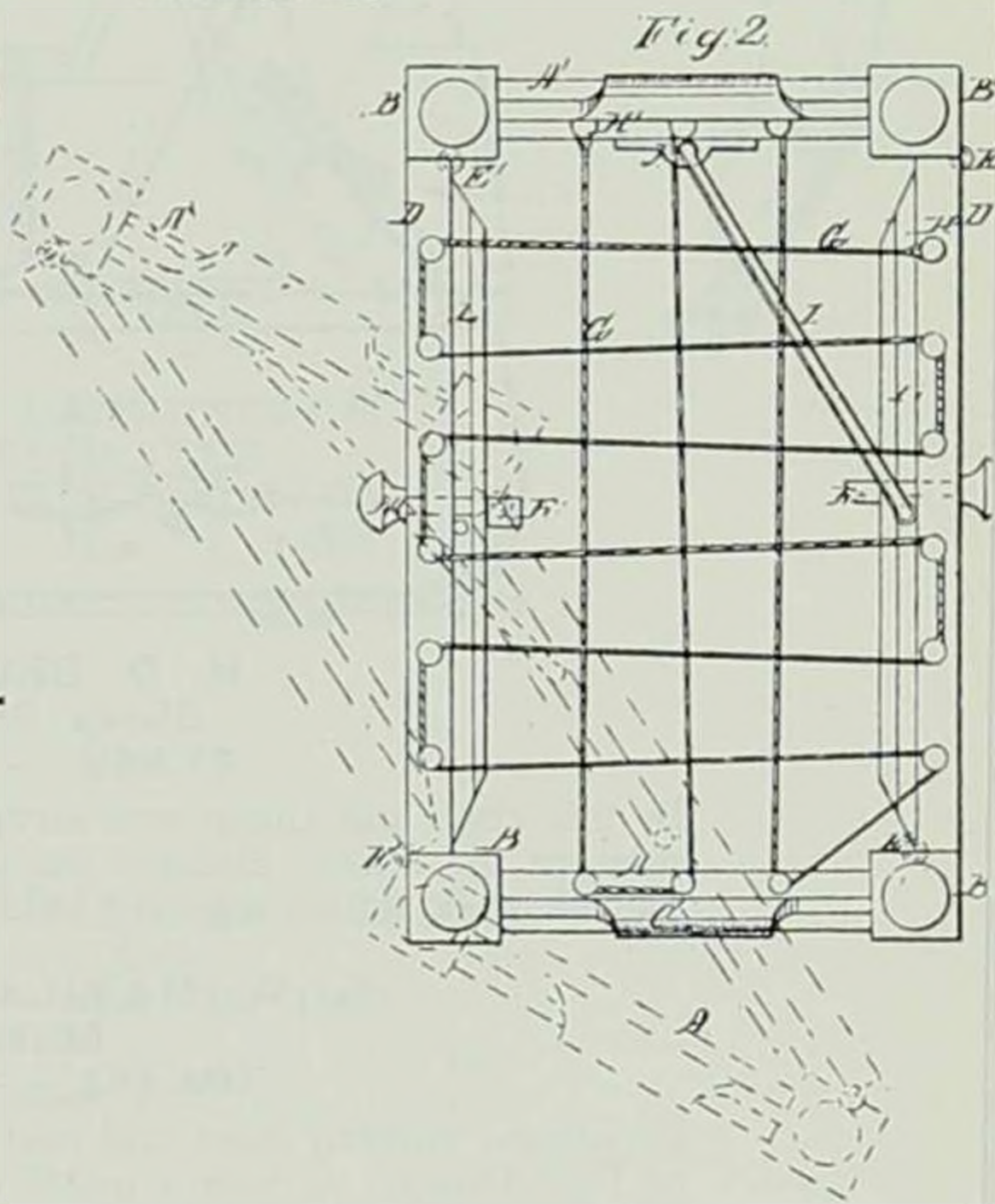
H. G. WILLIAMS, HAMILTON
Cradle

46,744 — Mar. 7, 1865

Horace G. Williams of Hamilton, Marion County, patented this self-rocking cradle. He placed it on a platform, D, encased a clock-like mechanism in E, and used a key to wind up the weight, F. He added a fan, r, for warm weather.

W. S. TODD
MECHANICSVILLE
Folding Bedstead
21,527—Sept. 14, 1858

A bedstead that could be folded was invented by William S. Todd of Mechanicsville.



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MARSHALL BLISS, GRINNELL
Mosquito Canopy

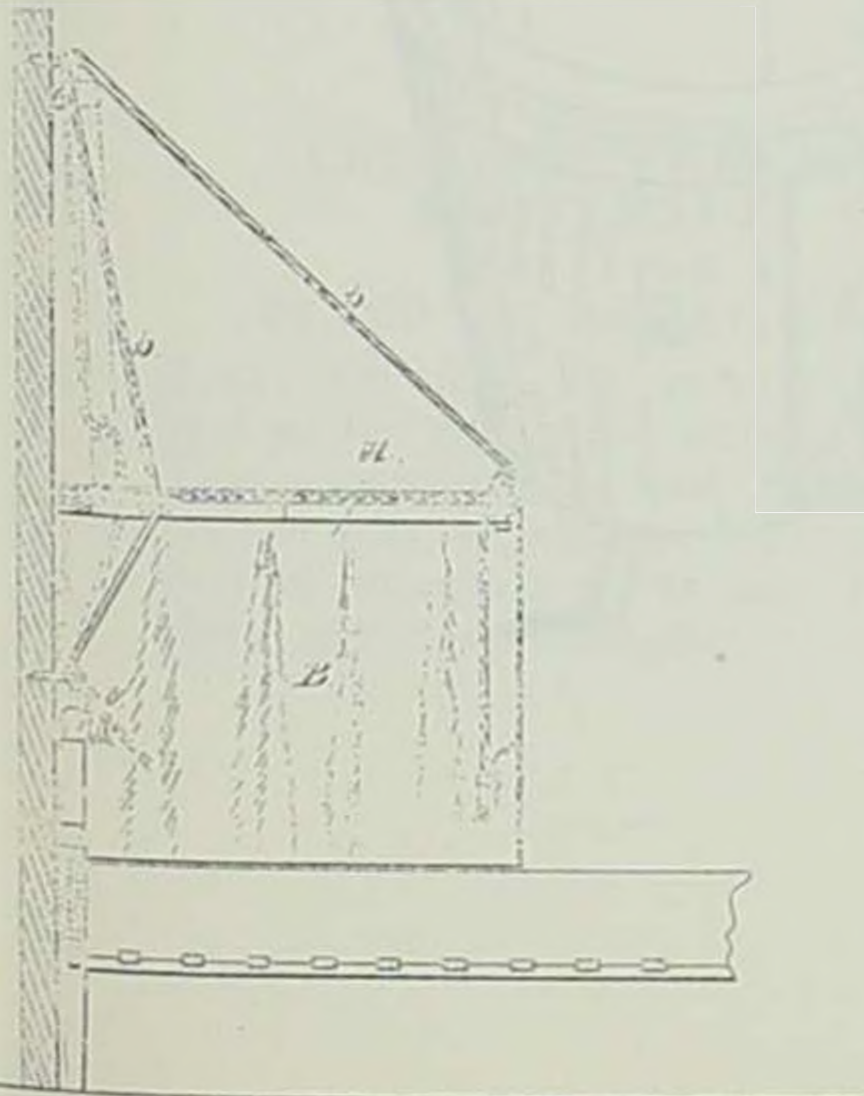
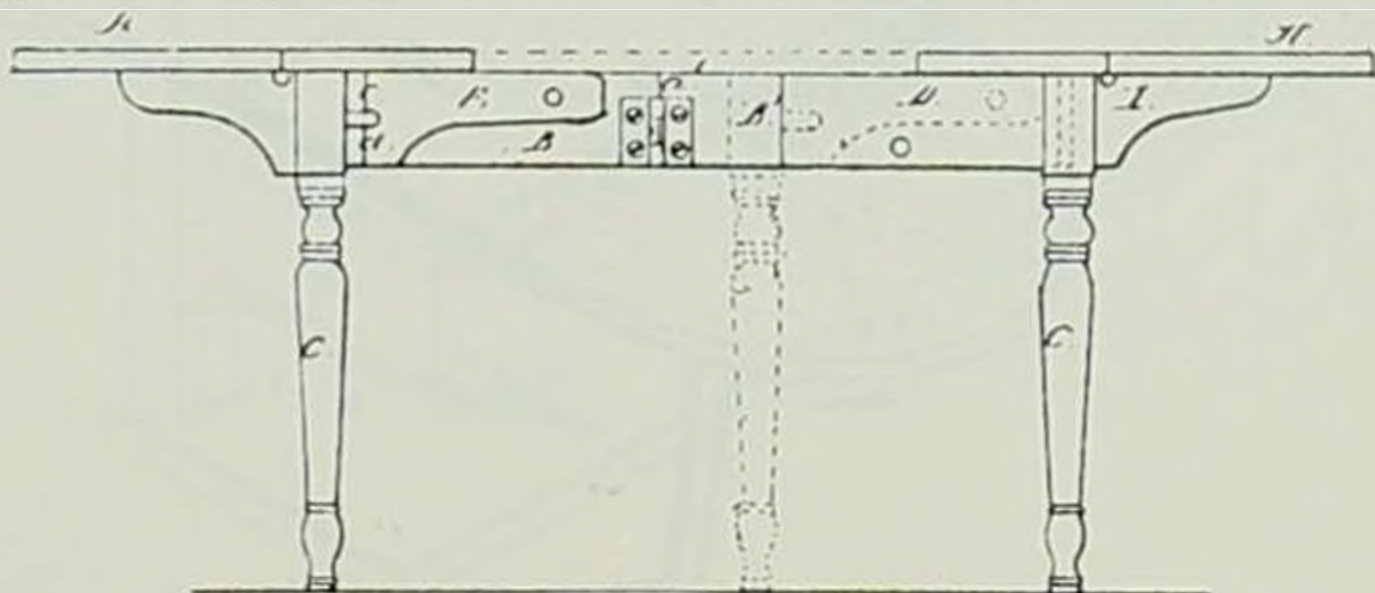
54,674 — May 15, 1866

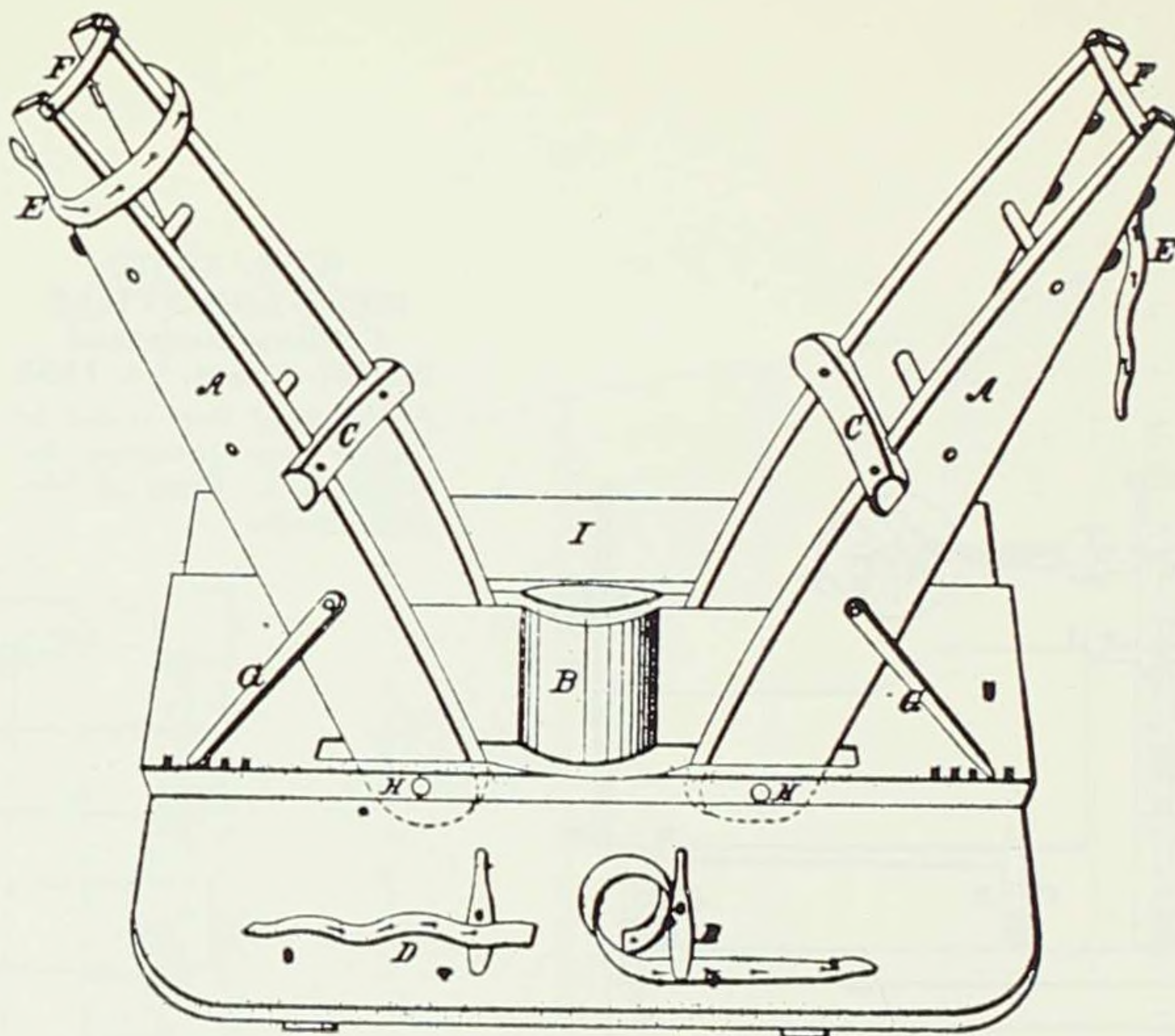
Mosquito canopy patented by Marshall Bliss of Grinnell.

CHARLES B. CLARK, MT. PLEASANT
Extension Table

18,733 — Dec. 1, 1857

A modern-looking extension table was patented by Charles B. Clark in 1857.



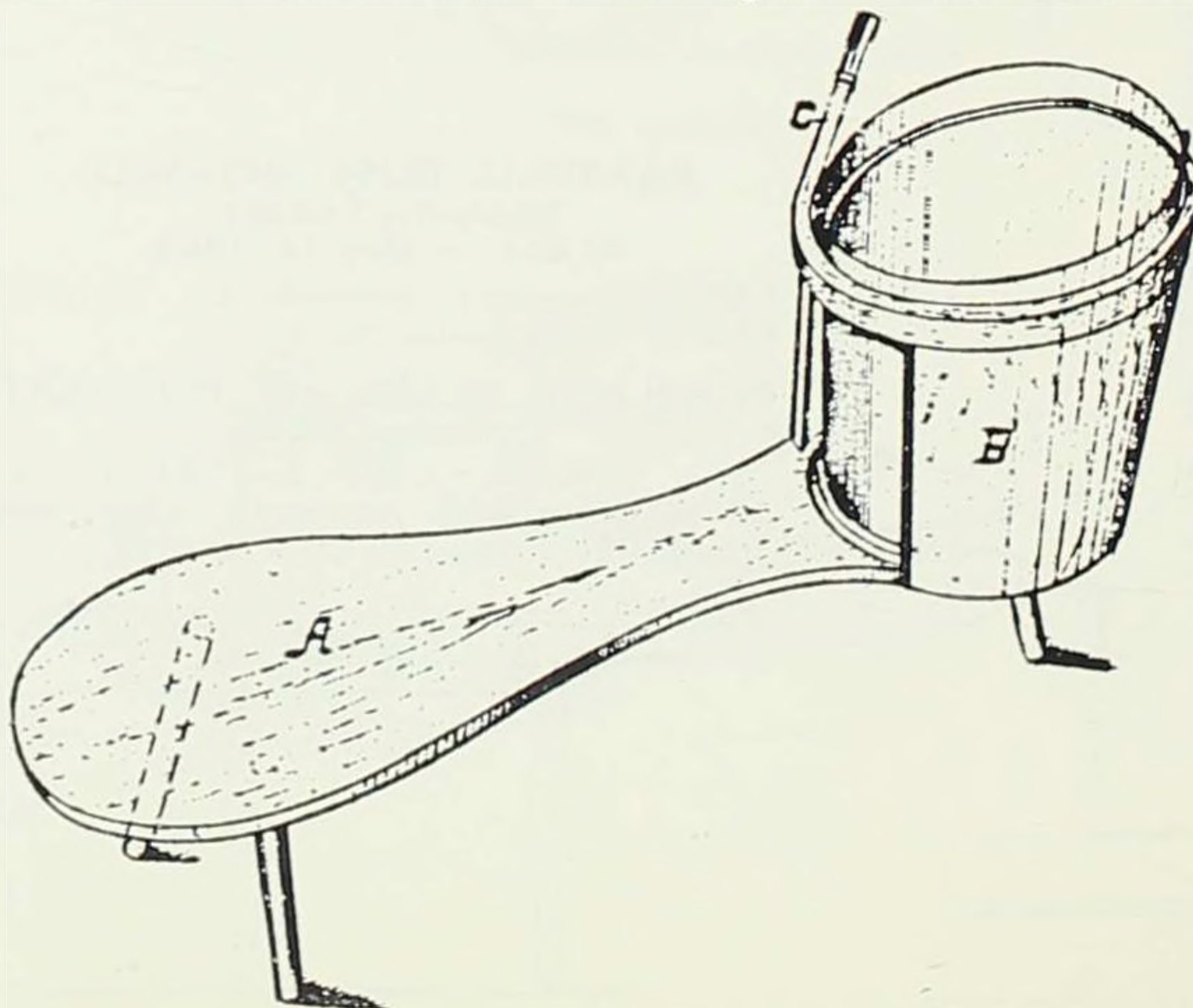


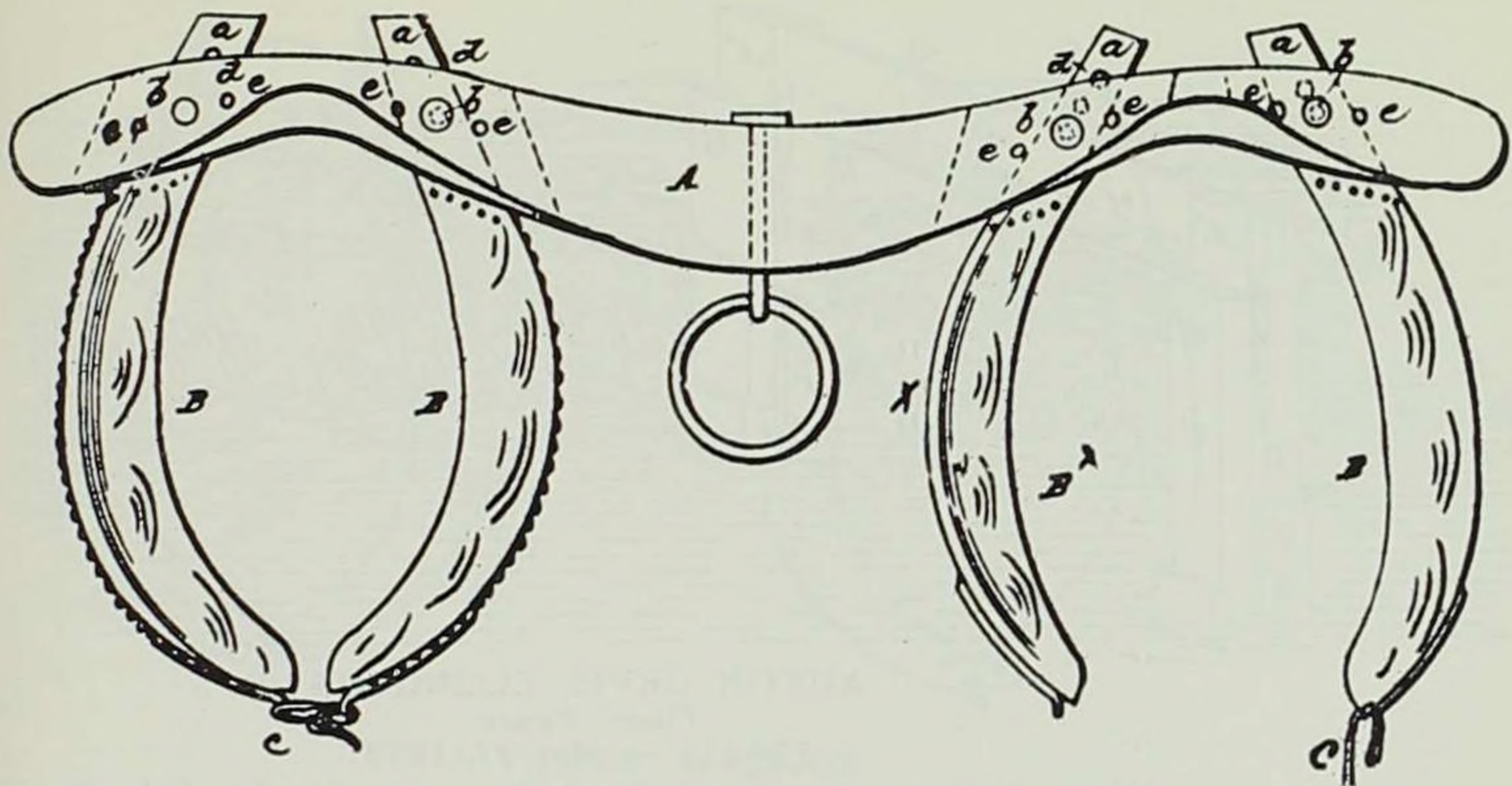
H. D. BROWN, TIPTON
Sheep Shearing Chair
77,866 — May 12, 1868

In this chair the sheep was strapped to part, A, first on one side and then on the other. Shearer sits at I and the buttocks of the sheep are placed at B. Hind legs are held by straps D.

G. W. HAVILAND, FORT DODGE
Milking Stool
104,452 — June 21, 1870

Combined milking stool and pail holder built by George W. Haviland of Fort Dodge. C was a guard to prevent the cow from kicking over the pail. It could also be split for securing the tail of the cow.



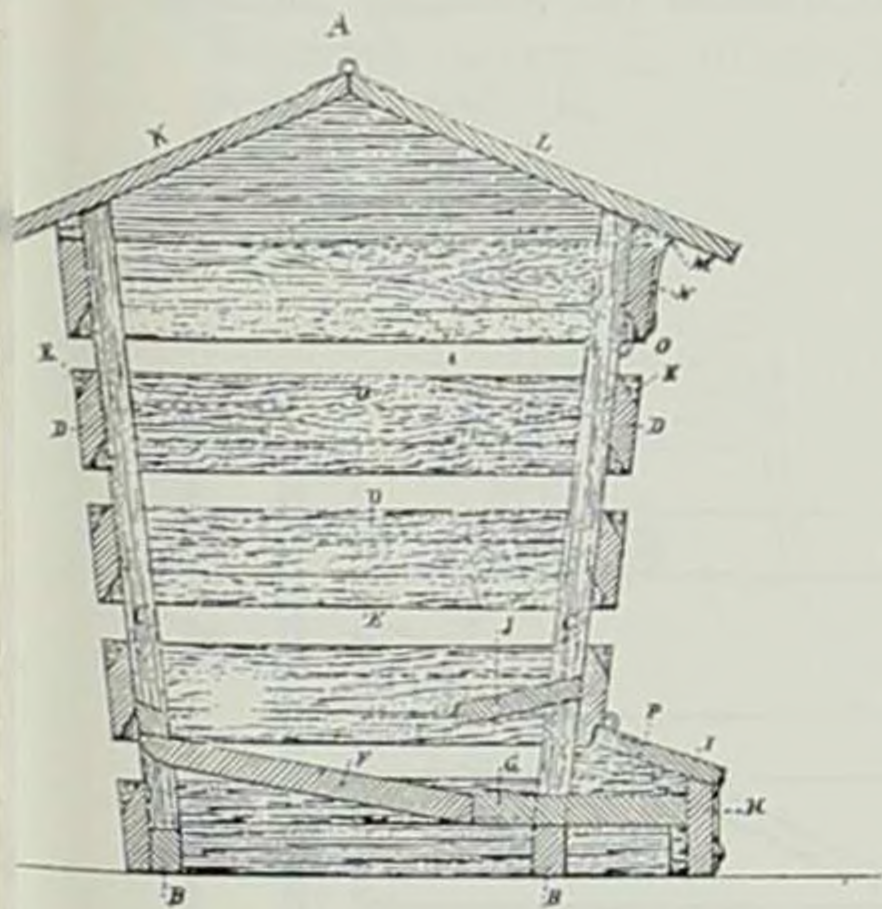


**JOSEPH LANGENBACH
DORCHESTER**

Ox Yoke

73,613 — Jan. 21, 1868

Langenbach invented an easily-fitted and secured ox yoke.



(Left)

C. B. CLARK, PLEASANT GROVE
Corn Crib

125,021 — Mar. 26, 1872

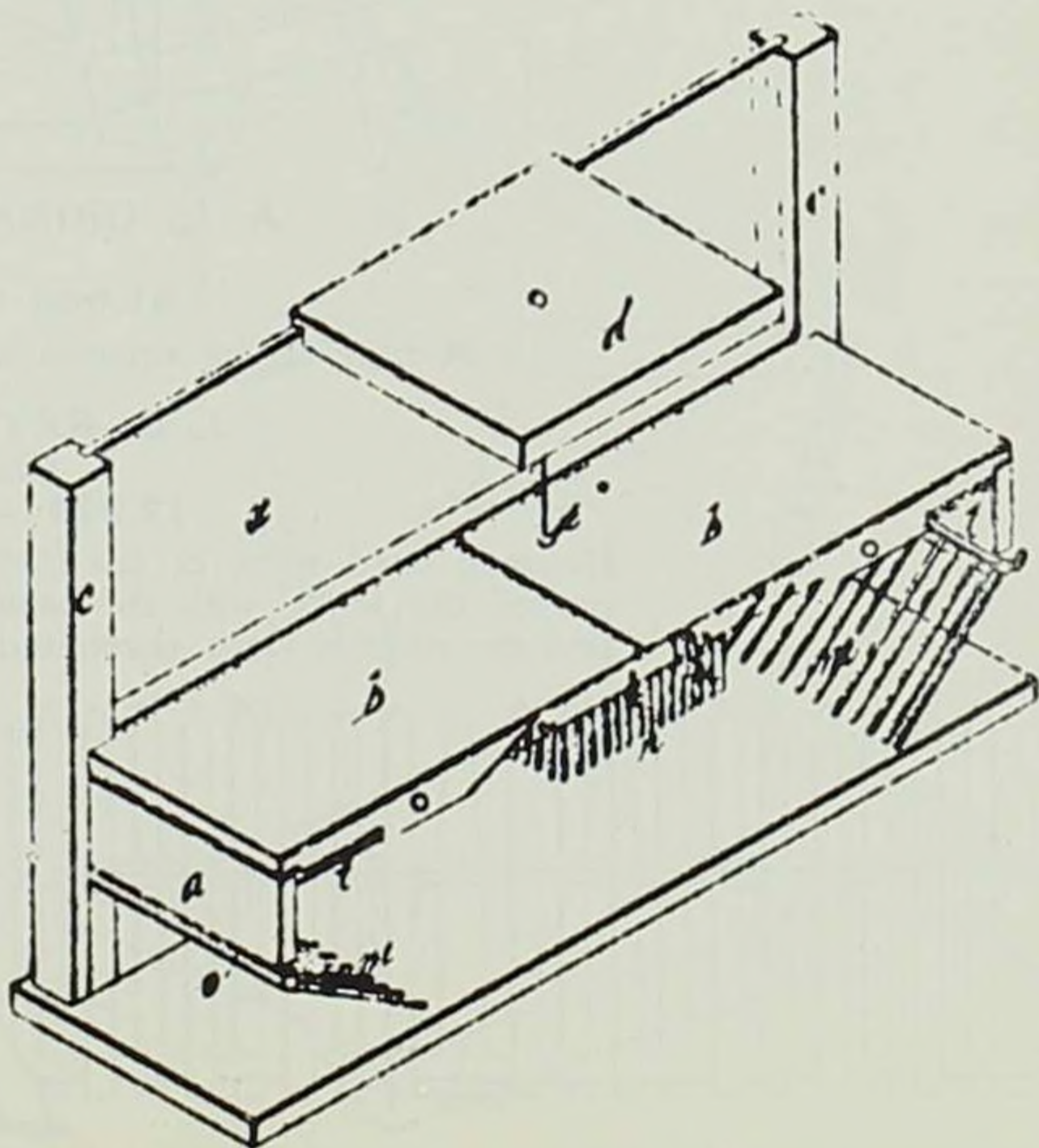
An improvement in corn cribs was patented by Commodore B. Clark of Pleasant Grove.

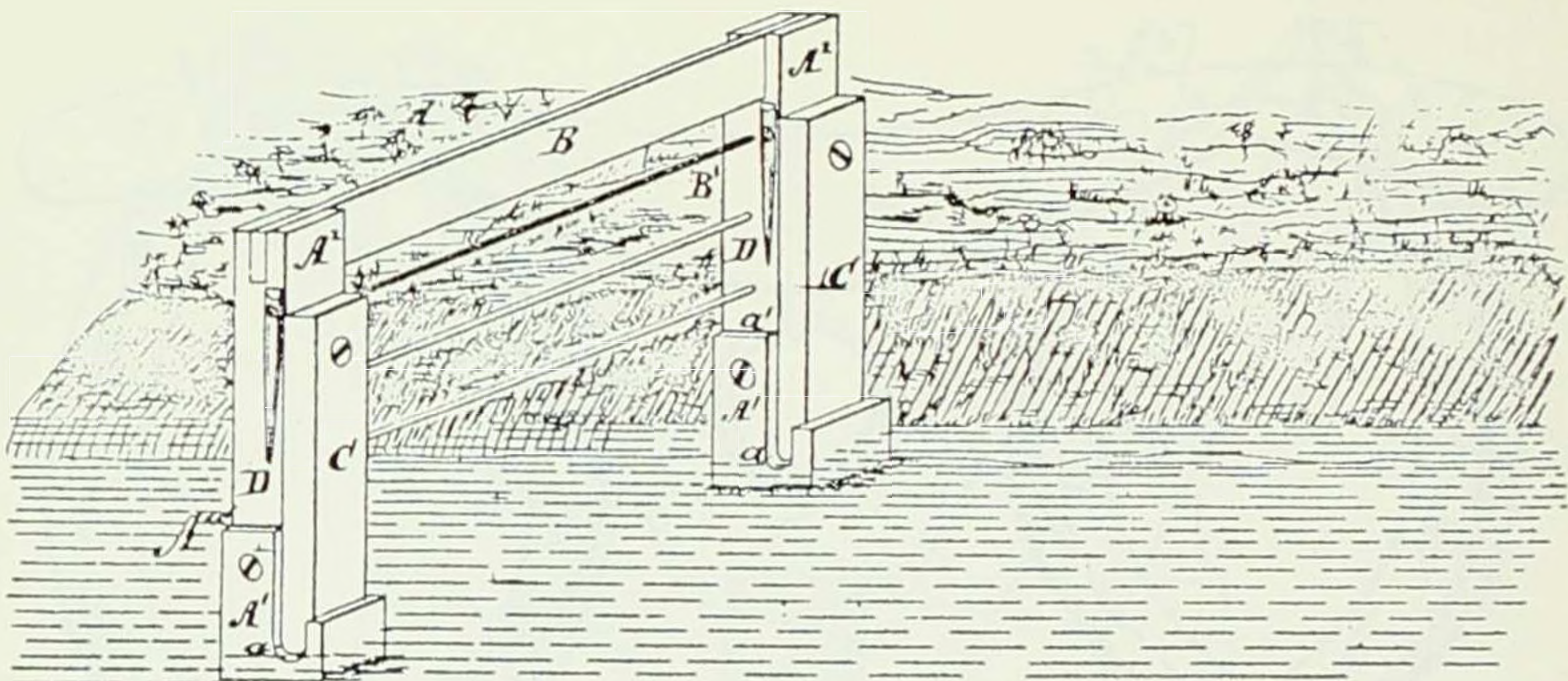
**LEONARD PARKER
WINTERSET**

Rat Trap

29,190 — July 17, 1860

Rats ran over the drop doors, b, and ended up in the section below. The extension, f, had holes in it so the rats would see light and go in that direction to escape. Instead they were exterminated.

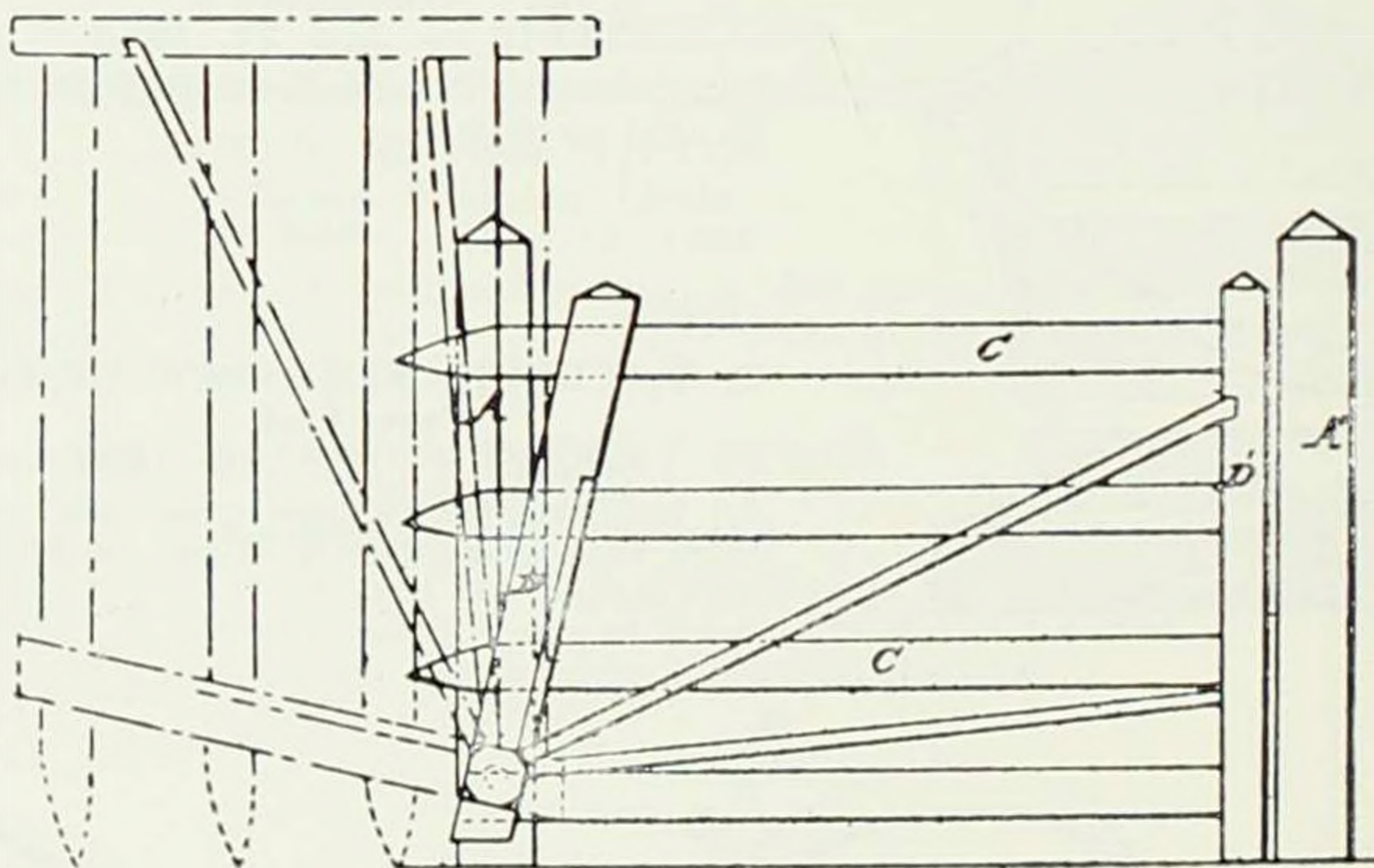




AUSTIN ORVIS, ELLINGTON
Flood Fence

139,418 — May 27, 1873

When stock was turned into the fields, section A², A² of the flood fence was turned to the perpendicular to prevent the animals' passage up or downstream.



A. L. GRINNELL, DES MOINES
Gate

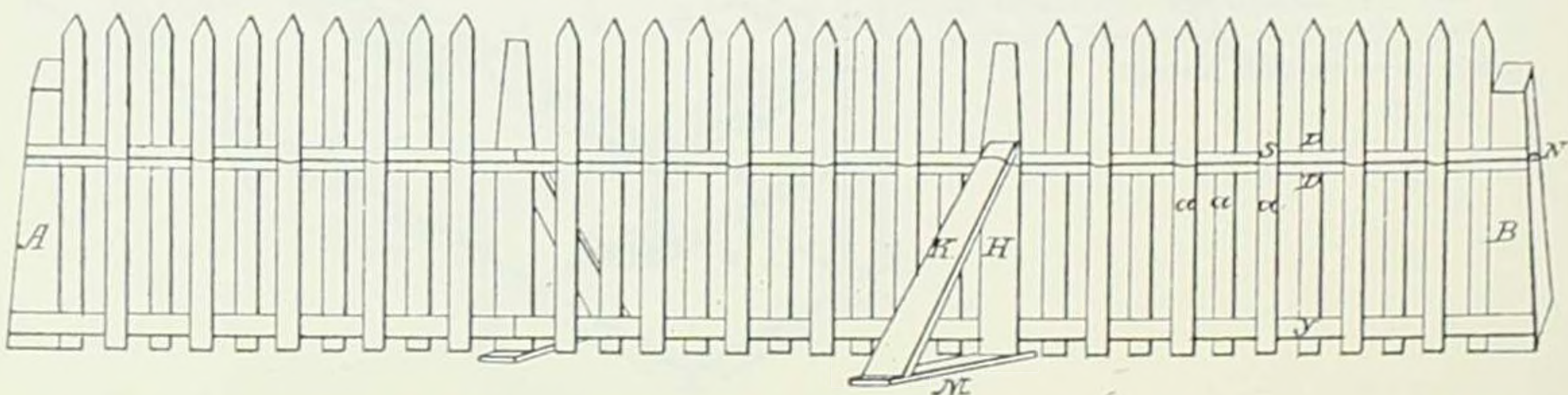
51,940 — Jan. 9, 1866

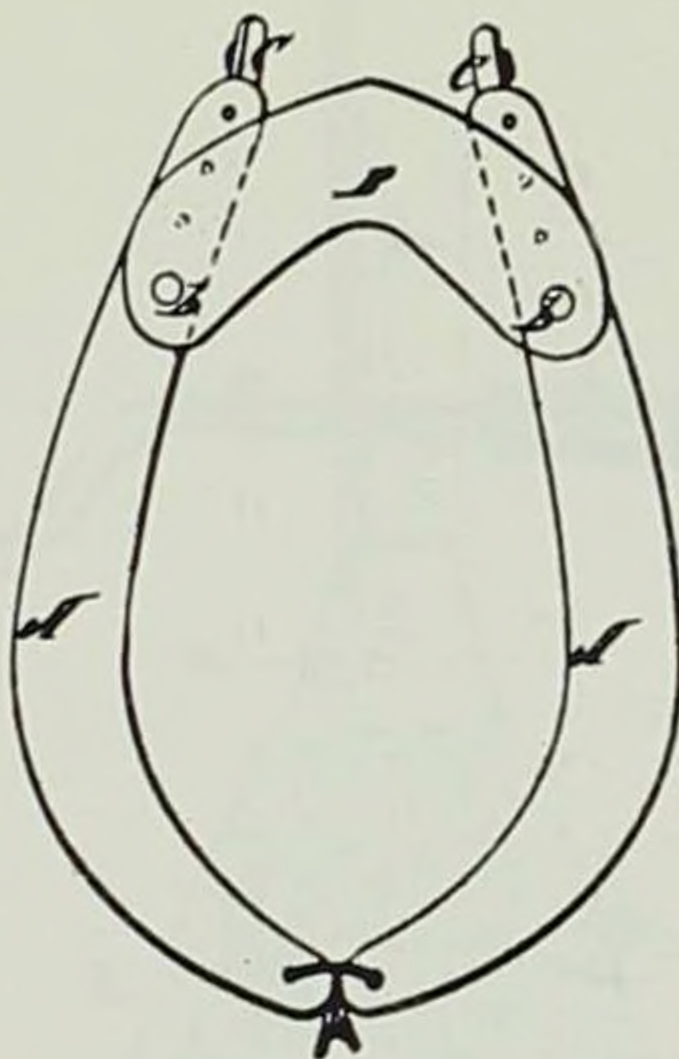
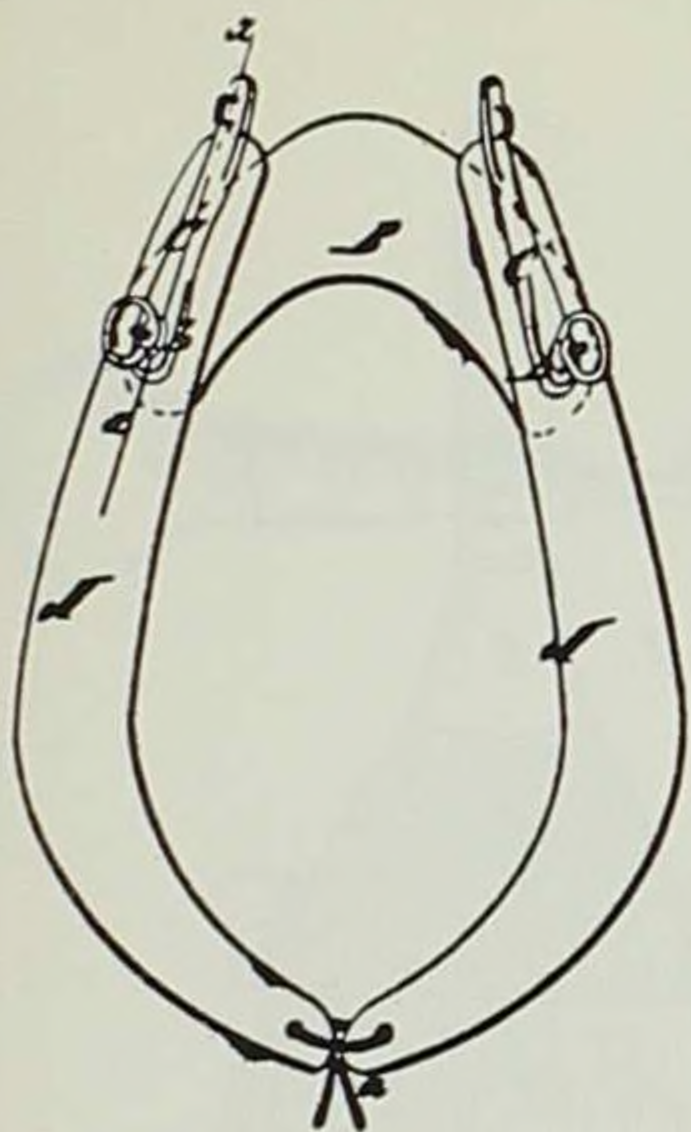
A gate to be opened vertically was patented in 1866.

J. B. REYMAN, DUBUQUE
Picket Fence

12,921 — May 22, 1855

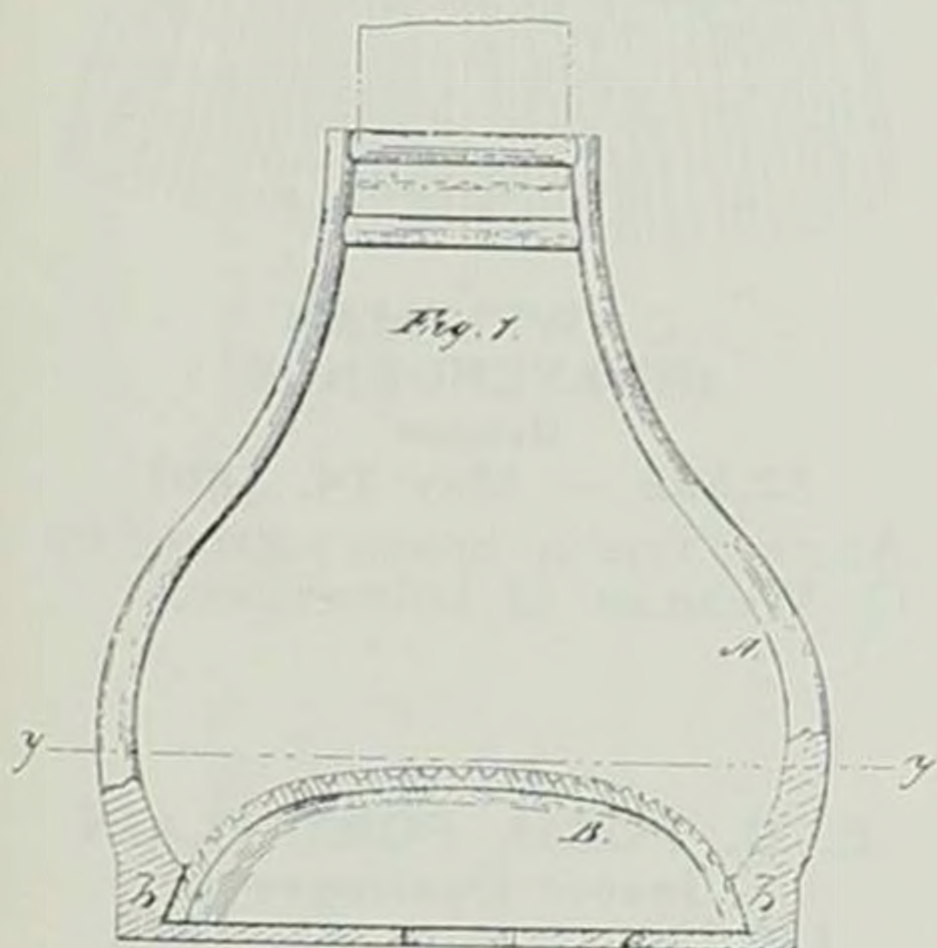
Reyman used wire, S, for fastening the pickets to the rails. He supported the fence with the triangle, K, M, and H. Both the supports and the pickets were alternated.





C. J. FISHER, WAUKON
Horse Collar
49,743 — Sept. 5, 1865

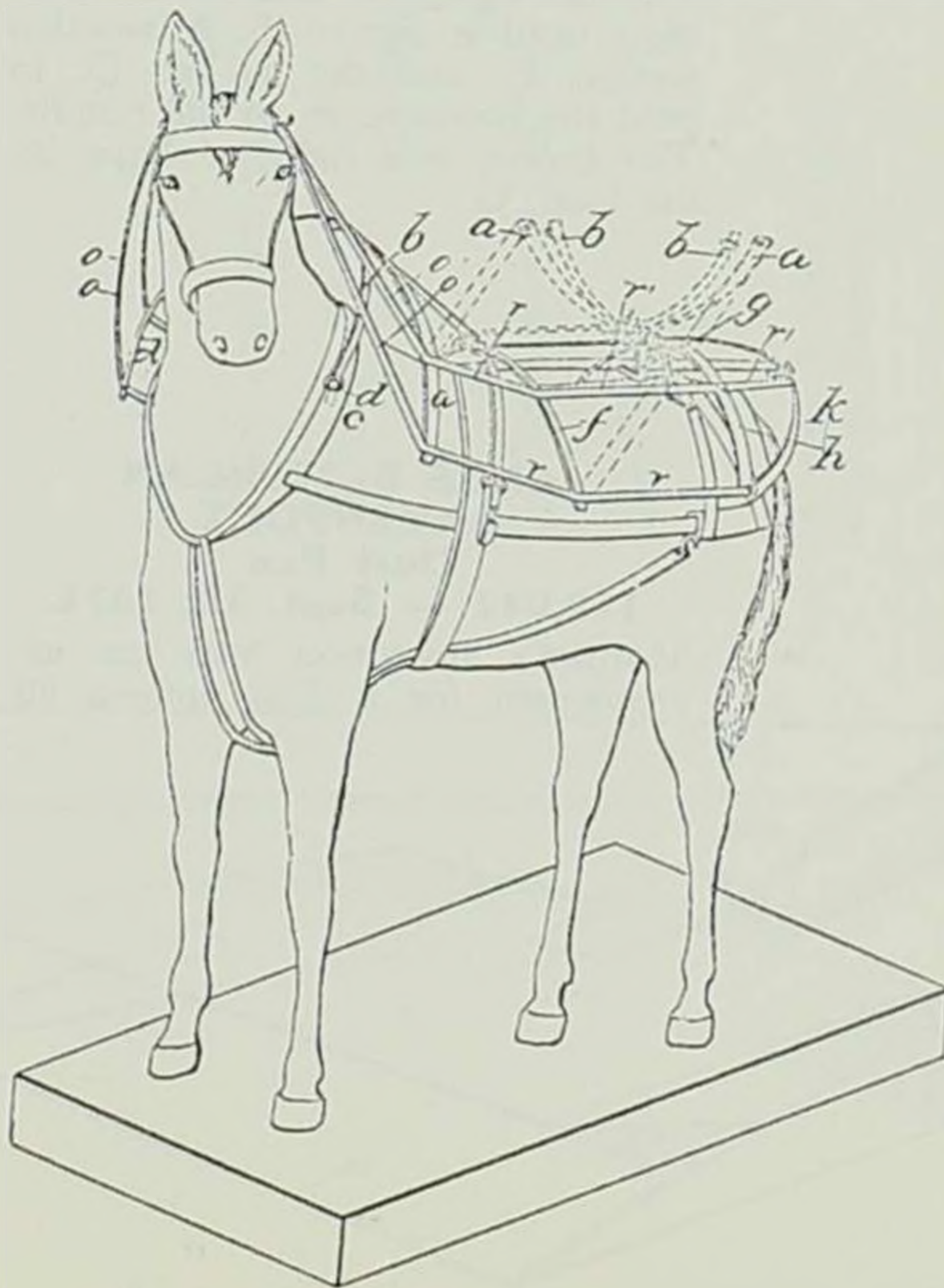
Wooden pieces, A, of this horse collar were connected with a leather yoke or pad, B.

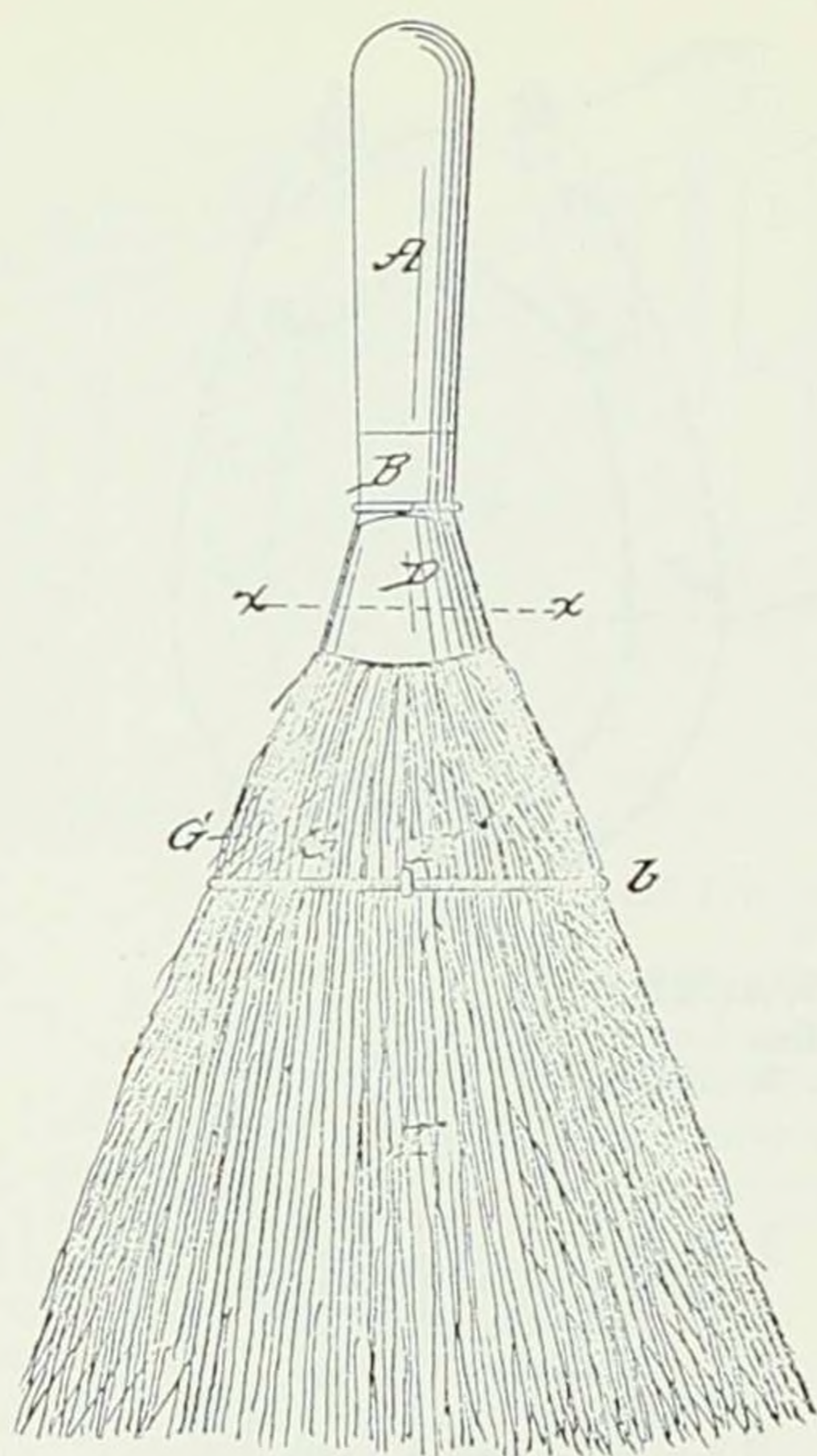


A. A. LIVINGSTON
CEDAR RAPIDS
Saddle Stirrup
33,354 — Sept. 24, 1861
Livingston added India rubber, B, to a saddle stirrup. He made it larger than the socket so it would form a convex and elastic foot piece.

N. PULLMAN, NEW OREGON
Horse Bonnet
18,300 — Sept. 29, 1857

An awning frame or "horse bonnet" was patented by N. Pullman of New Oregon, Howard County.

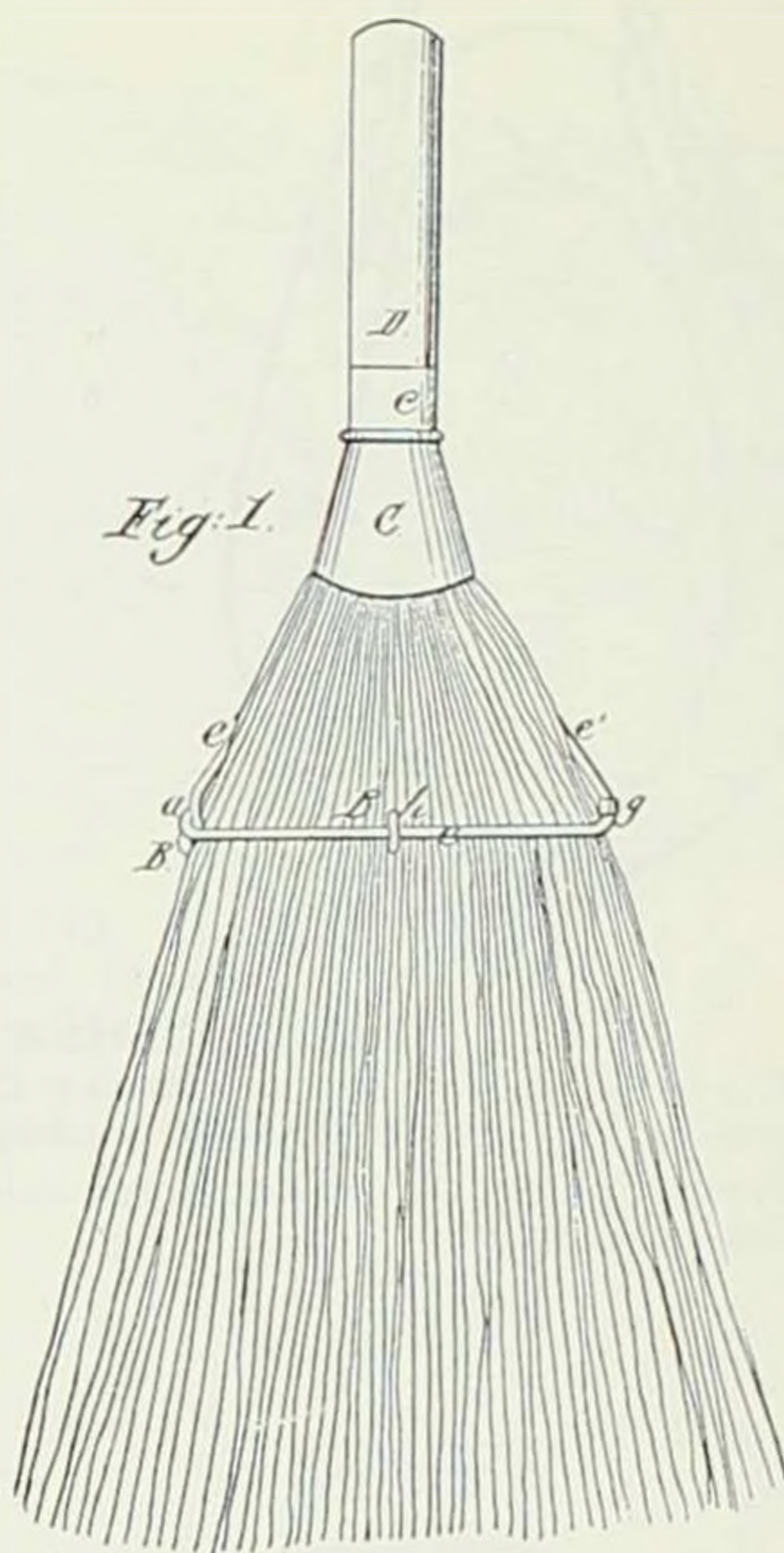




LANGDON & KELLOGG
QUASQUETON
Broom

32,299 — May 14, 1861

Thomas Langdon and H. C. Kellogg used a screw, F, a wooden wedge, E, and the socket, D, to hold the broom corn to the handle. The broom was held in shape by the loop, G.



C. WEITMAN
INDEPENDENCE
Broom

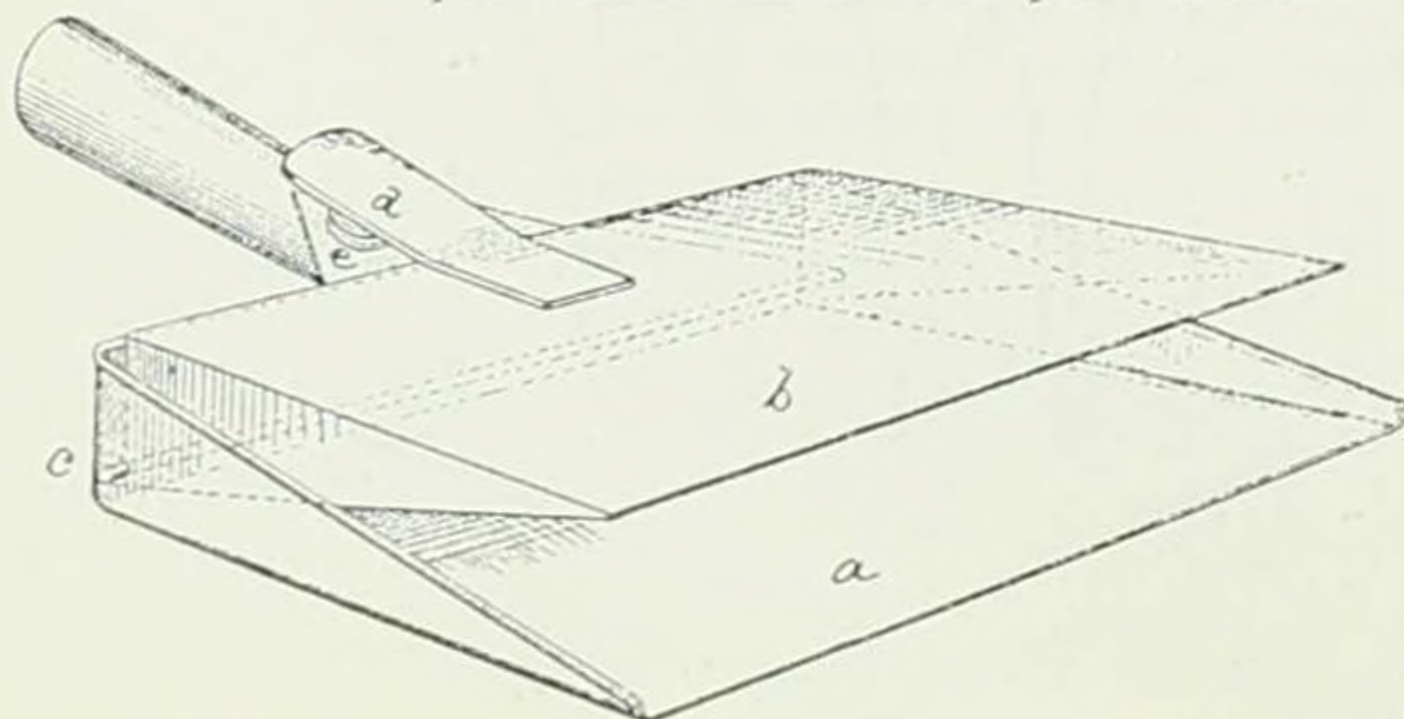
32,322 — May 14, 1861

Another type of broom patented by C. Weitman of Independence.

JAMES B. MORGAN
DAVENPORT
Dust Pan

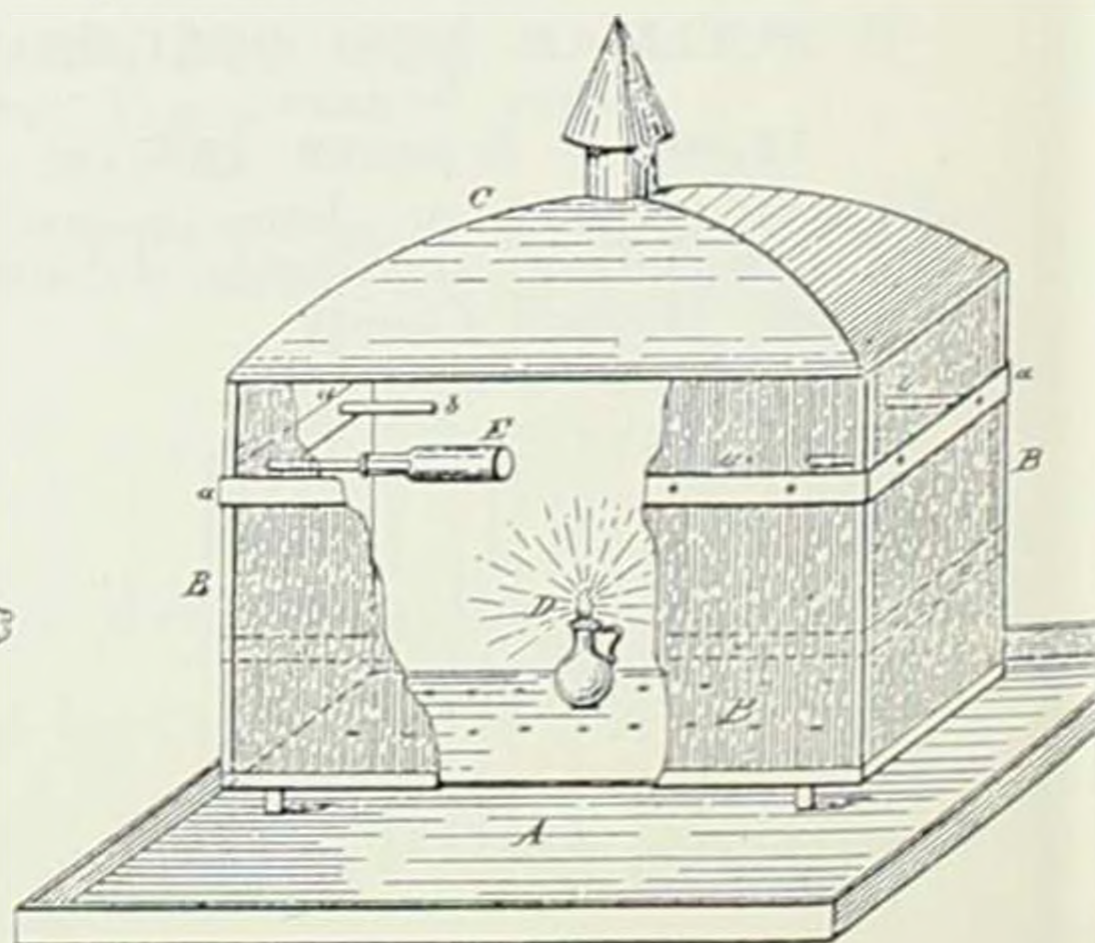
119,042 — Sept. 19, 1871

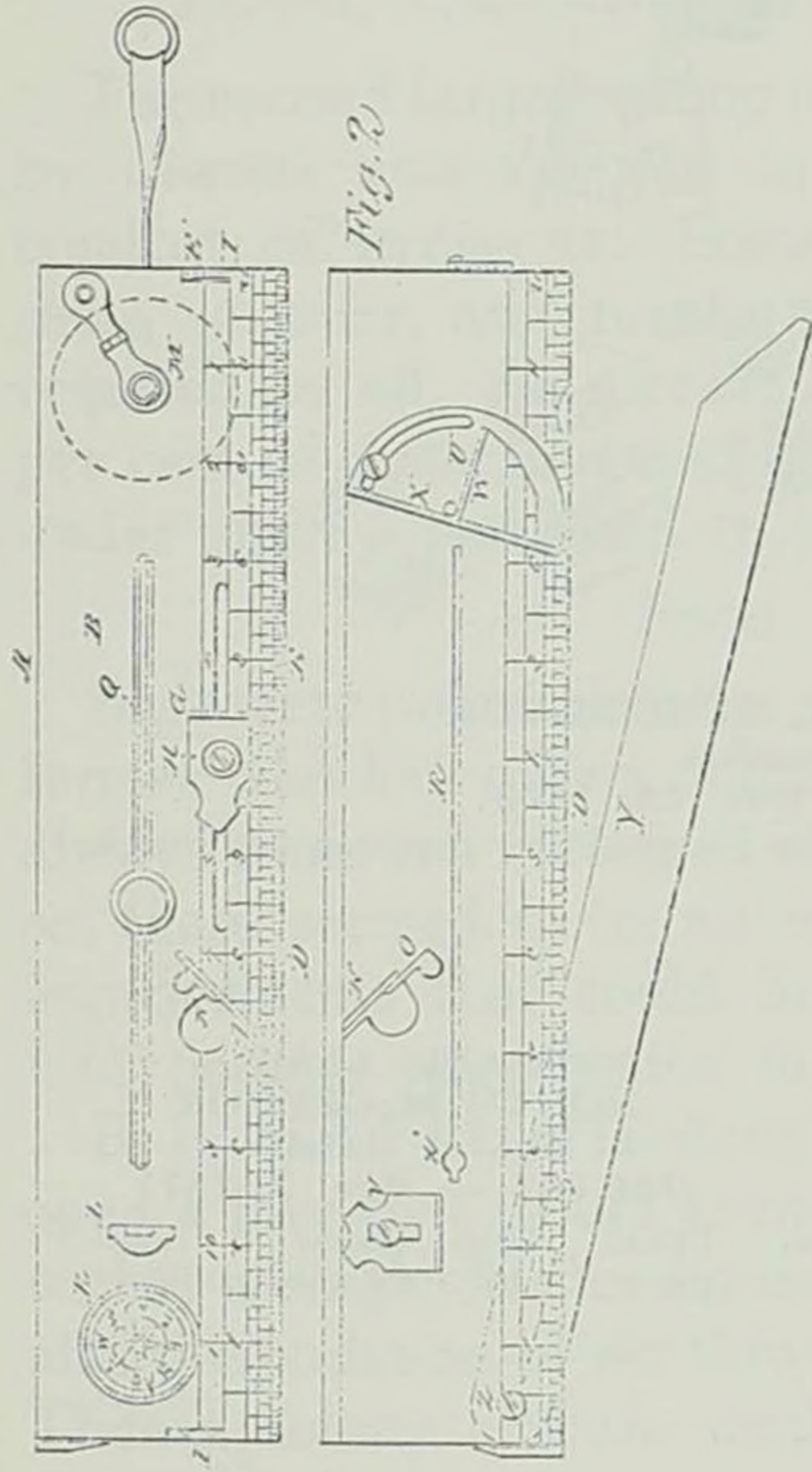
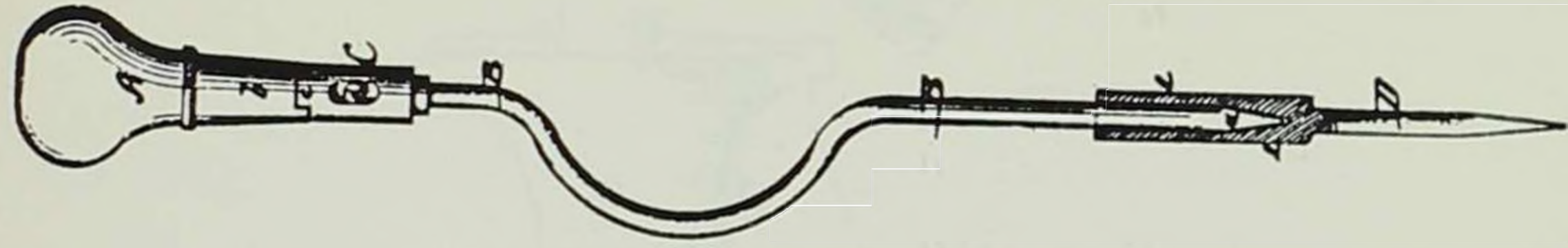
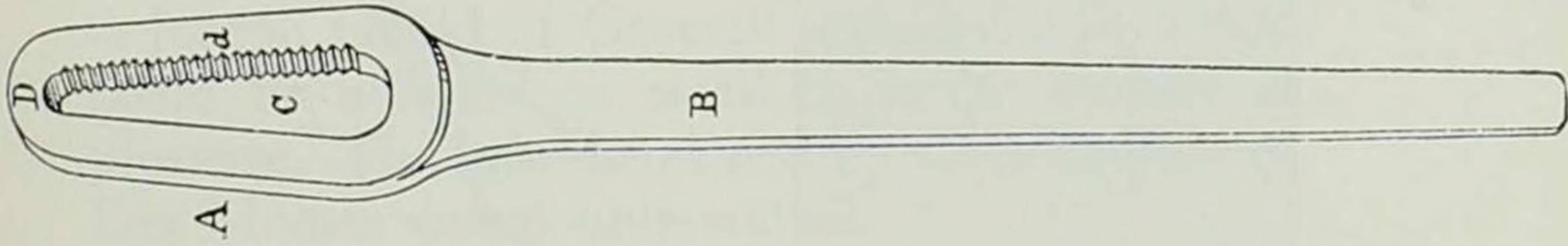
Morgan's invention was an improvement for a dust pan—a lid.



E. D. PUGH, FORT PLAIN
Insect Destroyer
130,390 — Aug. 13, 1872

Light D attracted insects, some of them falling into soapsuds or other liquid, A, and were destroyed. Others entered bottle, E, where they remained until removed.





W. A. SHARP
Bevel

101,773 — Apr. 12, 1870

Sharp combined various instruments used by carpenters in this single tool.

(Right)

DAVID DRUMMOND, McGREGOR
Screw Driver

98,933 — Jan. 18, 1870

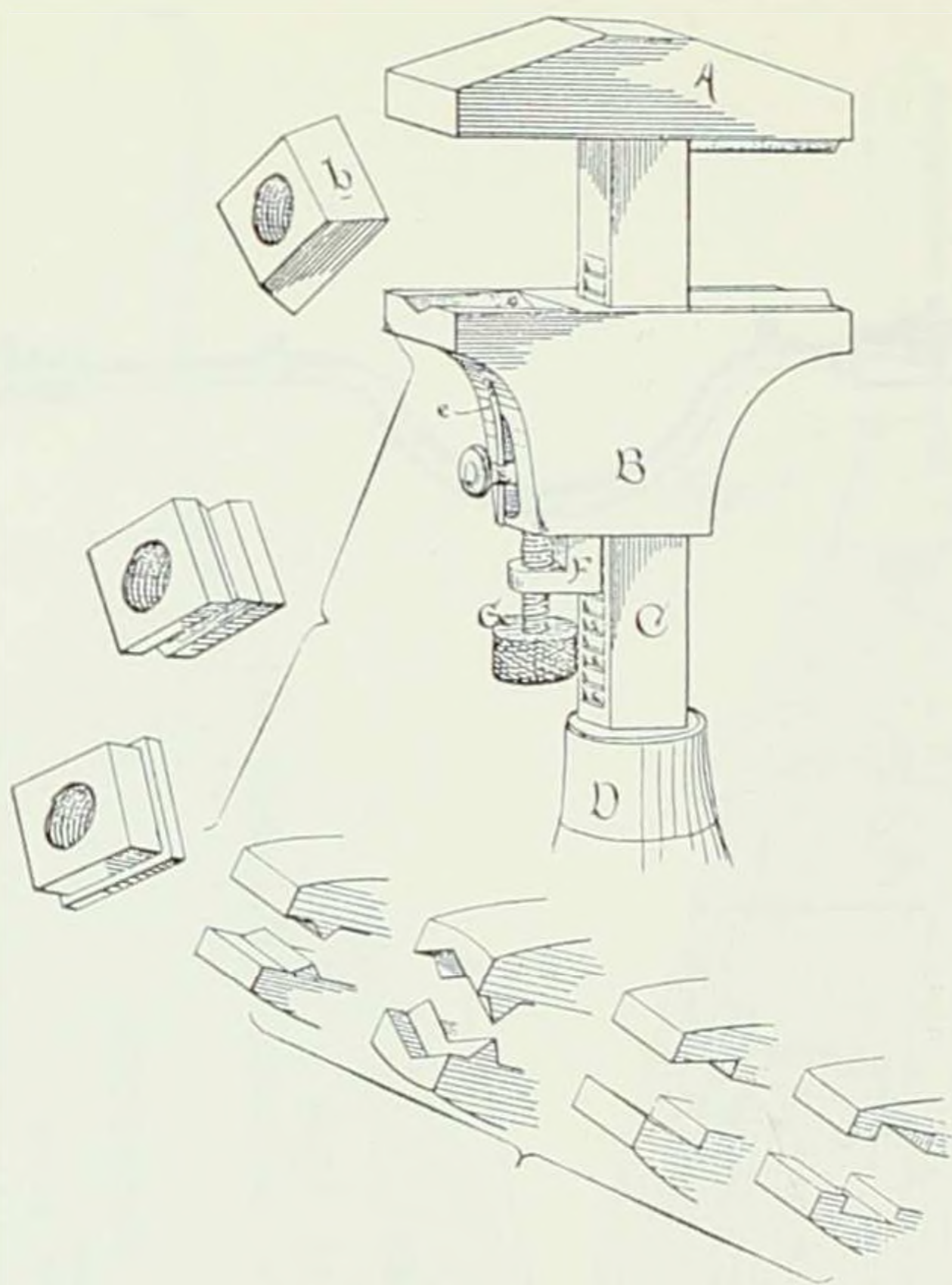
This screw driver was patented by David Drummond of McGregor.

(Left)

S. W. WAKEFIELD, KEOKUK
Wrenches

141,477 — Aug. 5, 1873

A wrench with a tapered slot, C, was the contribution of Samuel W. Wakefield of Keokuk.



F. L. DELFER, BURLINGTON
Wrenches

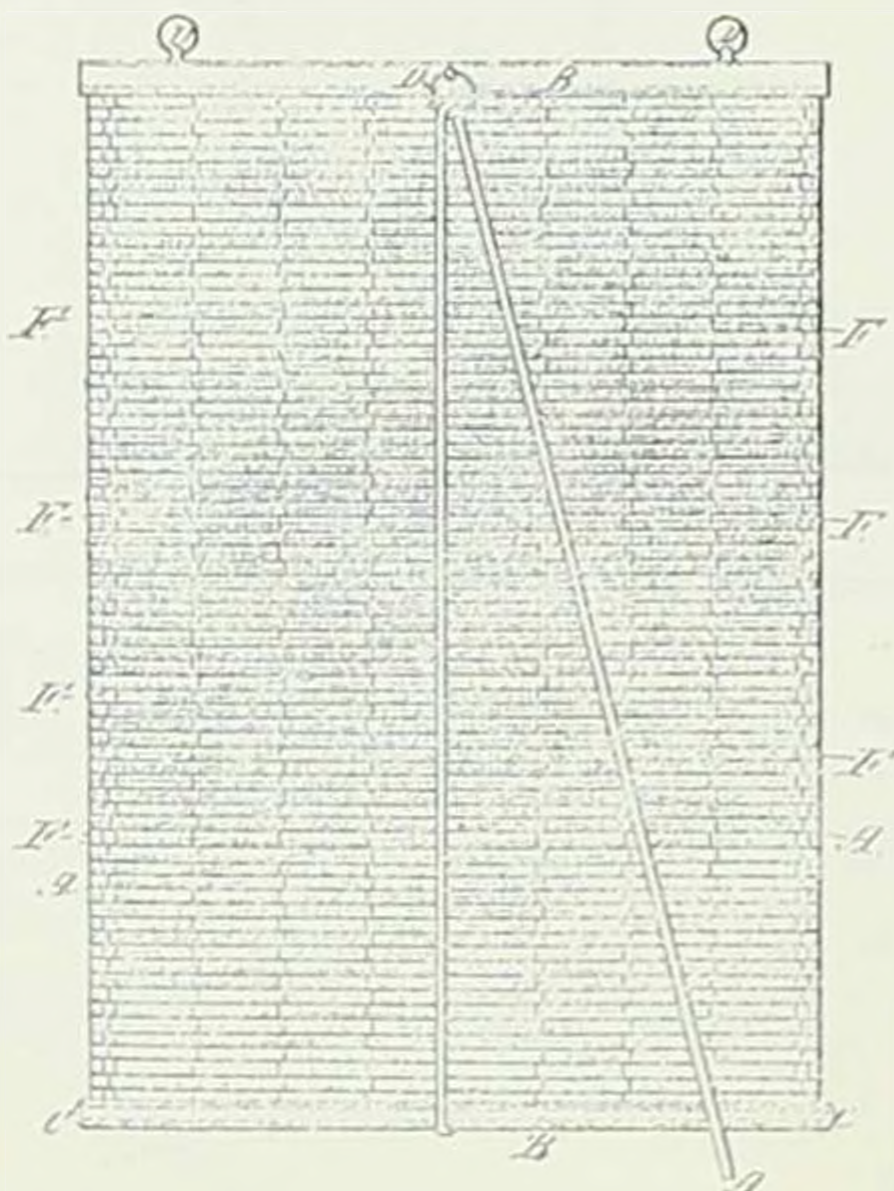
133,422 — Nov. 26, 1872

This wrench, with interchangeable clamps, was patented by Frank Leo Delfer of Burlington.

ADOLPH BINNER
MUSCATINE
Inside Blinds

64,062 — Apr. 23, 1867

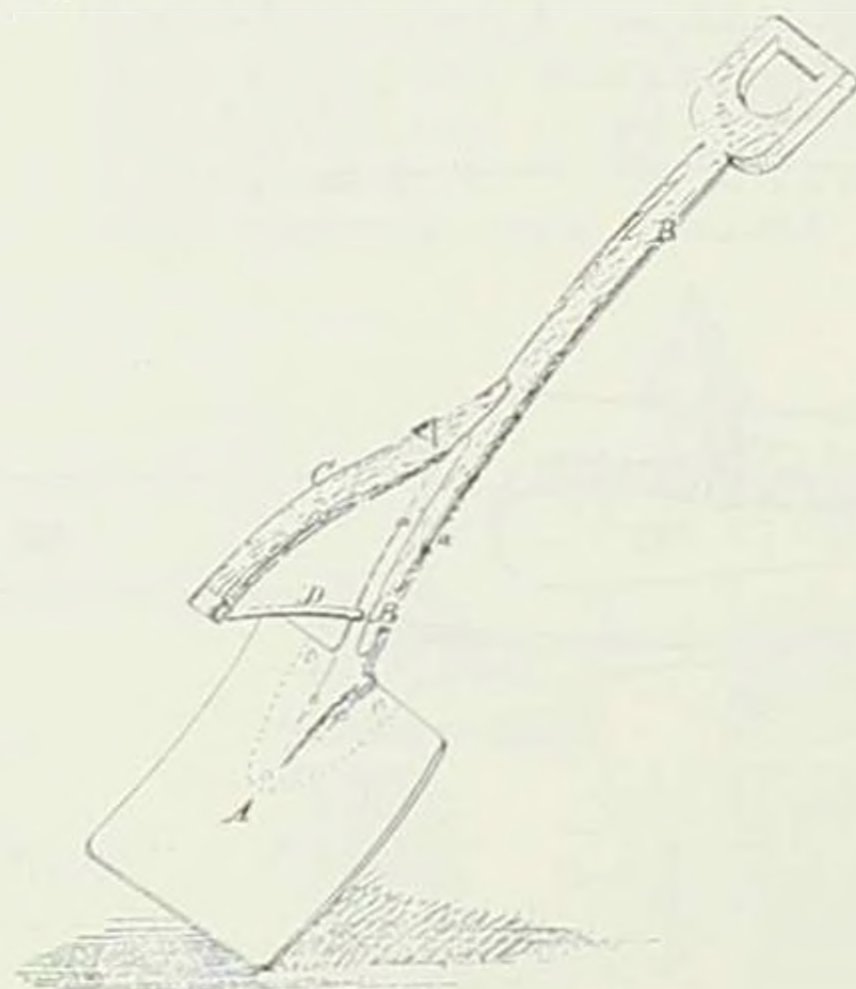
Round sticks were used in the window shade invented by Adolph Binner of Muscatine.



FRANK ALSIP
NORTH McGREGOR
Shovel Handle

120,607 — Nov. 7, 1871

Frank Alsip added a hand piece, C, to a shovel handle.



Food, Clothing and Furniture

The second largest group of inventions patented by Iowans was devoted to the necessities and comfort of everyone. Something to eat, something to wear, and furniture for the home were required by all. As a result, 438 patents, or 19.1 per cent of those invented during the thirty years under survey pertained to these basic concerns.

Food

Bees were plentiful and a source of food for any farmer who had a hive and a colony. Hives have always come in a variety of sizes and shapes. Even so, there seemed to be no end of new types and improvements that could be thought up. Fifty-four patents were issued in this category alone.

B. S. and E. H. Haviland of Ft. Dodge developed a hive that would keep a number of colonies within a single box or house. The object was to afford circulation of air through the several hives. Thus a colony of bees weak or few in numbers would be kept in a proper, warm state by heat from the other hives.

Joseph Gould of Grinnell invented a hive that could be adapted to small or large swarms at pleasure. The hive developed by Charles Finn of Des Moines was double-walled.

Many people had at least a cow or two and so a source for cream from which butter could be made. Forty-six invented churns and three, churn dashers. The one Jacob Dodder of Washington patented was designed to force the cream to the bottom of the churn. There it would be agitated and the butter concentrated instead of allowing it to collect in the upper part of the churn.

John Copeland and George P. Martin of Quasqueton had a new arrangement of inclined loops on the inner surfaces of a many-sided tub. This was supposed to circulate the cream so it would turn to butter faster. Nicholas Hospers of Pella connected the churn dasher to the actuator crank with a forked and pivoted connecting rod. This gave a reciprocating and rotary motion to the dasher.

A third source of food was sugar cane. In April 1862 the Burlington *Hawkeye* noted that a considerable amount of land in southern Iowa was being devoted to cultivating cane. On January 28, 1862, O. N. Brainerd of Marion patented his sorghum evaporator. Nearly at once it was being manufactured by McKendrie of Burlington. Brainerd was joined by thirty-two other inventors in developing evaporators, cane mills and other machines. *The Burlington Hawk-Eye Gazette* claimed that the sugar that came from these plants was very good, whiter than New Orleans sugar and equal to it in other respects.

A great variety of kitchen and garden tools and utensils used in food growing and preparation were developed. Hiram Smith of Des Moines patented a cook fork. There was a novel attachment whereby articles of food taken from a cooking vessel could be shoved off the tines of the fork without using the thumb or fingers and without scraping them off at the side of a dish.

I. W. Chesterman of Centralia invented a coffee pot that made good, clear coffee with full flavor in two or three minutes. "Coffee is never good that requires so long to prepare it by any of those inventions for distilling or filtering in the troublesome way."

A culinary boiler was patented by Thomas Dare of Osceola. He placed one vessel inside of another, the inner one being considerably smaller and secured with springs. The outer vessel contained water through which the contents of the inner were heated without danger of being burned.

To carry eggs to market or elsewhere, James R. Asher of Oskaloosa used canvas pockets, being suspended so as to keep the eggs separated. Allen S. Ballard invented an ice cream freezer with inner and outer ice chambers. The milk was between them. He also used scrapers to aid in agitating the milk and keeping it mixed.

David T. Rickey of Marshalltown patented a grape trellis. He lowered the grape vines to the ground in the fall without removing them from

the trellises. They could be covered and protected from the frosts of winter and raised again in the spring.

Honey

Beehives (52): Bear, Toledo; Boyers, Danville; Conwell, Knoxville; Cuplin (4), Iowa Falls; Davis, Newton; Donnel, Davenport; Engledow (2), Cedar Falls; Field, Independence; Finn (2), Des Moines; Frey & Frey, Hook's Point; Glass, Independence; Gould, Grinnell; Gruver, West Union; Gunn & Cain (2), Oskaloosa; Guthrie, Clifton; Harden, Chariton; Harned & Elliott, Boonesborough; Harper, Hillsborough; Haviland & Haviland, Ft. Dodge; Heckman, Brooklyn; Honeywell, Toledo; Klepper, Muscatine; Kline, Kirkville; Kretchmer (2), Pleasant Grove; Kretchmer, Coburg; Loofbourrow, Hillsborough; Mulford, New Providence; Neal, Orleans; Parker, Winterset; Patton, Tipton; Price, Buffalo Grove; Pugh, Fort Plain; Reece, Marion; Reeve, Tipton; Richardson, Webster City; Shaeffer & Shaeffer, Centerville; Shaw, Zionsville; Smith, Decorah; Smith & Reed, Decorah; Smith, Vosburgh, Kramer & Winter, Cedar Rapids; Stump, Adel; Ward, Millville; White, Mt. Pleasant; Wright (2), Oskaloosa.

Beehive portal, mothproof: Beard, Salem.

Bees, trellis for propagating: Simons, Fairfield.

Butter

Churns (46): Aldrich, Anamosa; Barr, Independence; Bartholomew & Dinsmore, Kirkville; Beaton, Grinnell; Beckley, Stiles; Bennett, Mt. Pleasant; Chamberlain (2), Dubuque; Christian & Beach, Hamburg; Cook, Lyons; Copeland & Martin, Quasqueton; Crane, Ottumwa; Dodder, Washington; Edgell, Alexander & Kellogg, Quasqueton; Elarton & Elarton, Hillsborough; Fassauer, Wheeling; Gillilan, Marion; Graham, Lyons; Harper, Hillsborough; Hart, Buffalo Twp., Linn Co.; Goldsmith, Burlington; Hess (2), Lyons City; Hindman & Hiatt, Sidney; Hospers, Pella; Klingenberg & Mau, Davenport; Lee, Oskaloosa; Lewis, Elkport; McCutcheon (2), Washington; McGlothlen, Chariton; McNeil, DeWitt; Montague, Keokuk; Myers, Lyons; Sanborn, Hartwick; Sanborn, Lyons City; Smith, Independence; Smith, Oskaloosa; Stafford, Burlington; Stephens, Washington; Terrell & Hussey, Oskaloosa; Vincent & Leslie, Quasqueton; Weddington, Winterset; Wilcox, Hamburg; Wildasin & Peek, St. Charles; Witmer, Cedar Rapids.

Churn-dasher (3): Belt, Newton; Owen, Council Bluffs; Ridler, Rickardsville.

Sugar

Evaporators, saccharine and sorghum (22): Bartle (2), Independence; Bartle & Putney, Independence; Beach & Day, Independence; Bourne, Peosta; Brainerd, Marion; Cole, Mt. Pleasant; Crowley & Johnson, Marion; Chitister, Chatham; Harter, Independence; Heaton, Kingston; High, Walnut Fork; Ingalls, Independence; Kindley, Oskaloosa; Merrill, Quasqueton; Moss, Waverly; Ninde, Oskaloosa; Stewart, Wapello; Sowin, West Irving; Thompson, Marion; Whisemand, Independence; Woodworth, Iowa Falls.

Sorghum stripper: Huff & Huff, Clinton.

Sugar boilers, preventing incrustation of: Hay, Burlington.

Sugar cane mill (4): Biddle, Knoxville; Briggs, Greencastle; Demarce, Fairfield; Ingalls, Independence.

Sugar cane, cutter for: White, Dubuque.

Sugar centrifugal machine: Hunt, Oskaloosa.

Sugar evaporator furnace: Perry, Tipton.

Sugar from sorghum, manufacture of: Garretson, Pilot Grove.

Sugar, removing foreign substances from: Hoover, Oskaloosa.

Food Processing and Handling

Baking powder: Copping & Weideman, Clinton.

Bread and candy cutter: Quinn, Keokuk.

Bread board and dough tray: Fulton, Pulaski.

Bread toaster: Paine, Dubuque.

Broiler: Willging, Dubuque.

Butter coloring compound: Bogart, Cramer & Lewis, LaPorte City.

Butter excavator: Eaton, Montana.

Cabbage cutter: Aeuer, Muscatine.

Can opener: Reed, Lyons.

Can opener and knife or fork combined: Kenderdine, Lisbon.

Candy cutter: Quinn, Keokuk.

- Coffee and teapot strainer:** Case, Waterloo.
- Coffee pot** (3): Chesterman (2), Centralia; Yates, Dubuque.
- Coffee roaster** (2): Daily & Dougherty, Mt. Pleasant; Petersen, Davenport.
- Cook fork:** Smith, Des Moines.
- Culinary vessel** (2): Dare, Osceola; Johnson, Des Moines.
- Dish heater:** Brand, Burlington.
- Doughboard:** Petterson, McGregor.
- Dough kneader:** Jones, Davenport.
- Dough raising apparatus:** Dodge, DeSoto.
- Drinking vessel cover:** Heuermann, Davenport.
- Egg carriers** (3): Asher, Oskaloosa; Washburn, Burlington; Wells, Oskaloosa.
- Fruit basket** (2): Converse (2), Dubuque.
- Fruit dryer** (2): Fence, Des Moines; Smith, Decorah.
- Fruit jar:** Holcomb, Mt. Pleasant.
- Fruit lifter, pressed:** Raymond, Waterloo.
- Fruit loosener, dried** (2): Holman, Waterloo; Ragan, Waterloo.
- Fruit mill:** Hull, Washington.
- Grape and flower picker:** Delano, Cedar Rapids.
- Ice cream freezer** (2): Ballard, Mt. Pleasant; Tilden, Prairie City.
- Kneading board:** Jones, Davenport.
- Lard boiler:** Branagan, Burlington.
- Meat chopper:** Peters, Ft. Madison.
- Oven** (5): Craine & Bloss, Fairfield; Moore (2), Davenport; Hamner, Newton; Shaver, Cedar Rapids.
- Oven, portable:** Robinson, Oskaloosa.
- Potatoes, keeping sweet:** Davis & Davis, Fairfield.
- Refrigerator:** Giebrich, Ottumwa.
- Trellis, grape** (4): Custer, Davenport; Elliott (2), Cedar Rapids; Rickey, Marshalltown.

Vault for wine, potatoes, etc.: Weed, Muscatine.

Vegetable cutter (2): Bleyley (2), Ottumwa.

Water cooler and refrigerator: Comstock, Keokuk.

Clothing

There were 203 Iowa inventions that were related in some manner to clothing. They covered all phases from raising and processing hemp, flax and cotton to manufacturing and keeping the clothes clean.

As has been noted, John Godden of Pittsburgh was the first Iowan to receive a patent. He added a second vibrating frame of slats similar to those used in other machines. The second frame moved up and down simultaneously with the upper frame but not in the same direction. It was inclined obliquely in the direction in which the hemp moved. Feeding and cleaning were effected by small rollers which revolved about seventy-five times a minute. Three others also patented hemp and flax processing machines.

Strange as it may seem for a non-cotton growing state, D. Hess of West Union patented a cotton cleaning machine in October 1859. In 1865 J. A. Hall of Keokuk patented a combined cotton chopper, cultivator and drill.

The next step was the spinning of the cotton or flax. Fourteen inventions of this type were patented. C. C. Vanderpoll of Osage made a machine in 1869 for doubling and twisting woolen and cotton yarns. He claimed it could do 25 to

50 times as much as any machine then in use. He planned to construct it so as to be attached to the spinning jack. A man who had been manufacturing cloth for 25 years called it "a great improvement, and a labor and expense-saving machine." Even so, it apparently never was developed beyond this early stage.

Looms were necessary after the yarn had been spun. Twenty-eight patents for looms or mechanisms for them were granted to Iowans. John Whitehead of Oskaloosa developed a hand loom on which striped or fancy cloth could be woven rapidly, even by a child. His application for a patent included an affidavit that on July 11, 1866, at the home of W. Goss, he wove $58\frac{1}{2}$ yards of twill between 8 a.m. and 5 p.m. During the evening of the same day he wove $9\frac{1}{2}$ yards in 60 minutes. On July 12 he wove 52 yards and $71\frac{1}{2}$ yards the next day.

Elias Howe, Jr. of Cambridge, Massachusetts, received a patent for a new sewing machine on September 10, 1846. Although this was considered a great stimulus to making clothes, no Iowan received a patent for any improvement until A. R. and C. S. Byrkit of Fairfield did in 1868. Most Iowa contributions to the sewing machine came in the form of attachments to ruffle, embroider, plait and gather the cloth. With only two or three exceptions these were invented between 1870 and 1873.

Few innovations in clothing were made that led to patents for Iowans. Iowa's first woman inventor, Lucinda Humphrey of Tipton, did invent a skirt protector for which she received Patent No. 35,026 on April 22, 1862. It protected the bottom of skirts and dresses from being soiled by contact with the ground in wet weather.

Miss Humphrey used a strip of oiled silk or muslin long enough to extend around the periphery of the skirt. It was also of sufficient width to double over the edges and extend upward on both the inner and outer sides. The material was secured to metal loops which hooked into eyelets on the bottom of the petticoat. It would be worn out of sight on ordinary occasions. When desired, the wearer could tuck the bottom of her dress into the protector and proceed over wet ground without "being compelled to carry it raised in her hands."

Alfred Arnemann of Guttenberg patented a pocketbook protector in 1868. He used a spring catch for retaining pocketbooks and other articles in pockets or on wearing apparel to prevent their being lost or "fraudulently abstracted." C. S. Merriman of Villisca developed an inflatable garment to prevent drownings.

One may conclude that the Iowa pioneer obviously felt strongly about keeping his clothes clean. No less than 72 patents for washing machines were issued to them by 1873.

Ebenezer Gordon of Cedar Rapids claimed his washing machine would thoroughly cleanse clothes. At the same time there was no danger of clogging the machine and preventing its free operation. Tearing off buttons was "effectually obviated," he claimed.

J. A. Hammer and Thomas Chadwick of Newton developed an automatic clothes washer in which dirty water was drawn off and fresh water brought in. In the wash boiler patented by Ore Baldwin of Keokuk water was caused "to circulate violently" through fabrics by the action of heat. John Epeneter and Bernhardt Grahl of Council Bluffs added bristles to a washboard for which they received a patent in 1872.

Soap was an essential too. Francis M. Pleins and James Beach were the owners of the Dubuque Lard-Oil, Soap and Candle Factory, organized in October 1855 as F. M. Pleins and Company. In 1873 Pleins patented his method of making soap. His "soap is claimed to be of a superior quality, is manufactured by an entirely new process . . . and . . . is marketed to jobbers in Dubuque and the West," according to one writer.

Earlier patents for soap were issued to Horatio N. Wilbur of Keokuk and L. H. Van Spanckeren of Muscatine. Wilbur's soap was supposed to be good for removing paints, oils and dirt from clothing of every description. His formula consisted of $1\frac{1}{2}$ gallons soft water; 6 pounds shaving soap; 6

oz. sal-soda; 2 oz. each of turpentine, ammonia, alcohol, and marble dust; 1 oz. each of dissolved camphor, white rosin and dissolved alum; $\frac{1}{4}$ oz. Prussian blue or Chinese vermillion; and $\frac{1}{4}$ oz. of saffron. The mixture was boiled until all ingredients were well dissolved.

Van Spanckeren used entirely different ingredients for his soap— $5\frac{1}{2}$ pounds wood lye, 30° of strength; 3 pounds grease; $1\frac{1}{2}$ pounds potatoes; 6 oz. wheat flour; 2 oz. gum-tragacanth, and the yolk of four eggs. He carefully outlined the soap making process. Boil the potatoes first, then mash and pass them through a sieve; add $1\frac{1}{2}$ pounds of lye and stir thoroughly. Gum-tragacanth should be dissolved in one pound of lye, requiring about one week. Beat the egg yolks well.

Melt the grease; then add the potatoes, then the gum and then the eggs. Keep at a heat a little hotter than the hand can bear. Add the rest of the lye and continue to stir. Flour should be added slowly and the heat increased until all is entirely mixed. Put out fire and continue to stir until the soap becomes thick.

Robert French of Keokuk invented machinery for forming soap into balls in 1861.

A number of sad, flat and fluting irons were patented also. Among the inventors was another woman, Mary F. Potts of Ottumwa, who received two patents for her unusual sad irons in 1870 and 1871.

Cloth Making

Cotton chopper, cultivator and drill: Hall, Keokuk.

Cotton cleaning machine: Hess, West Union.

Flax and hemp breaking and cleaning machine: Godden, Pittsburgh.

Flax-brake and swingler: Cowan, Bloomfield.

Hemp-brake (2): Gillman, Walnut Fork; Witt & Sinn, Davenport.

Loom (21): Carter & Spake, Salem; Fretz, Cono; Garretson, Clay; Garretson (2), Salem; Garretson & Garretson, Mt. Pleasant; Gordon & Frame, Salem; Harsin & Kirkpatrick, Kirkville; Hayes, Salem; Henderson, Keokuk; Henderson & Henderson, Salem; Hodson, Mt. Pleasant; King & King, Salem; McDowell, Wassonville; Mendenhall, Fairfield; Silvis, Birmingham; Walker, Salem; Walker & Hartley, Salem; Wardel, Milton; Whitehead, Oskaloosa.

Looms, mechanisms for (7): Brookfield, Brookfield; Deen, Bolding & Perry, Dayton; Fellows, Harrison & Dyer, Maquoketa; Gordon, Mt. Pleasant; Henderson, Keokuk; Naylor, Manchester; Wareham & Waggoner, Kirkville.

Spinning machine (13): Abel, Vernon; Albright, Oskaloosa; Blaney, Lowell; Byrkit, Fairfield; Eberhard, Sigourney; Evans, Paris; Grant, Mt. Pleasant; Hart, Des Moines; Hart & Reesman, Farmington; Moxley, Muscatine; Silvis, Birmingham; Tetler, Batavia Station; Wolf, South English.

Spinning machine reel: Bradway & Bradley, Maquoketa.

Woven fabric: Richman, Muscatine.

Sewing Machines

Needle setter, threader & cutter: Johnston, Ottumwa.

Needle threader: Stanley, Montezuma.

Sewing machine (4): Byrkit, Fairfield; Hirons & Moore, Grinnell; Rogan, Newton; Steward, Dubuque.

Sewing machine attachments for ruffling, plaiting, embroidering, gathering, etc. (26): A. Johnston (8), Ottumwa; W. Johnston (2), Ottumwa; Johnston & Johnston (2), Ottumwa; Leech, Winter-set; Lewis, Manchester; Moore, Grinnell; Rush, Chariton; Stewart (2), Ft. Madison; Toof (4), Ft. Madison; Wells, Webster; Woolworth, Ottumwa.

Sewing machine caster: Plank, Bloomfield.

Tatting shuttle winder (2): Jones, Davenport; Moore, Grinnell.

Apparel

Apparel, safety attachment for pocket of: Arnemann, Guttenberg; Jones, Grand River.

Clothing, submarine: Merriman, Afton.

Life preserving dress: Merriman, Villisca.

Skirt protector: Humphrey, Tipton.

Washing and Ironing

Clothes dryer (2): Gransden, Dubuque; Stowell, Dunlap.

Clothes line holder (2): Browne, Des Moines; Peters & Williams, Keokuk.

Clothes line reel, automatic: Farrah, Des Moines.

Clothes pin: Strain, Des Moines.

Clothes pounder: Morgan, Delhi.

Clothes wringer (4): Cooper, Independence; Fox, Farmersville; Hampton, Mt. Pleasant; Knox, Mt. Pleasant.

Damper for flat-iron heater: Moore, Lyons.

Flat-iron heater (2): Hall, Albia; Moore, Lyons.

Mangle (2): Converse, Dubuque; Gransden, Dubuque.

Sad irons (5): Anderson, Montana; Gulihur, Montana; Potts (2), Ottumwa; Shaw, Lansing.

Sad iron holder: Von Doehren & Reimers, Davenport.

Soap manufacture (4): French, Keokuk; Pleins, Dubuque; Van Spanckeren, Muscatine; Wilbur, Keokuk.

Wash board (2): Cook, Mt. Pleasant; Epeneter & Grahl, Council Bluffs.

Wash boiler (7): Baldwin, Keokuk; Case & Case, Des Moines; Hammer & Chadwick, Newton; Maxson, DeWitt; McDaniel, Dubuque; Wallace, Keokuk; Woodman, Dubuque.

Wash boiler attachment (7): Chapman, Afton; Glanville, Dowville; Reinking, Des Moines; Schloesser, Des Moines; Schramm, Des Moines; Sherman, Corning; Williams, Grinnell.

Wash tub attachment: Baldwin, Keokuk.

Washing machine (72): Adams, Montana; Baldwin, Summitville; Beaton, Grinnell; Beckley, Toledo; Carter (2), Franklin; Clark, Pulaski; Cole, Marshalltown; Connoran & Shafer, Red Oak; Courser, Burlington; Davis, Keokuk; Dennis, Marion; Deroose, Primrose; Dillan, Villisca; Dodder, Washington; Downer, Baldwin; Ehart & Ehart, Ft. Madison; Fiscus & Arney, Albion; Fox, Farmersville; Fox, Oskaloosa; Freed, Sioux City; George, Pulaski; Glines, Postville; Gorden, Cedar Rapids; Gould, Hamburg; Hall & White, Oxford; Hampton, Mt. Pleasant; Hildebrand, Dubuque; Hill, Boone; Hoover, Boonesborough; Horsey, Rome; Ingalls, Muscatine; Johnson, Des Moines; Jones (2), Davenport; King, Hamburg; Knox (2), Mt. Pleasant; Kuhlman, Dubuque; Lamb, Davenport; Lampson, Lyons; Leffingwell, Nevada; Marr & Maughlin (2), Onawa; Martin, Orford; McDaniel, Salem; Milner (2), Des Moines; Mundy & McConaughy, Washington; Myers, Lyons; Nissen, Davenport; Noble (2), Delhi; Oedamer, Muscatine; Pendleton, Iowa City; Reneky & Keiss, Cedar Falls; Richardson, Hopkinton; Seymour, Boone; Shearer, Drakesville; Shearer, West Grove, & Haynes, Centerville; Short, Wallen & Craig, Mt. Pleasant; Shuck, Oskaloosa; Streeter, Smithland; Thompson, Kirkville; Todd, Mechanicsville; Turley, Council Bluffs; Ward, Millville; Wharton, Richland; White, Oxford; Wilcox, Hamburg; Woolsey (2), Bloomfield.

Washing machine, heater for: Pratt, Davenport.

Furniture

Most of the patents for furniture were for bedsteads and springs. Some were folding beds of various types. Others were similar to that of Philander P. Simmons of Davenport. His "spring bed bottom" consisted of a web made of slats woven together with wire. This was used in combination with wooden strips and spiral springs.

Horace G. Williams of Hamilton built a child's cradle so perfectly balanced and regulated that it would rock with greater or less speed as desired.

Weights and balances replaced the hand or foot as the source of power. Isaac S. Goodman of Winterset also patented an automatic cradle. It was operated by clockwork. The weight of the person in the cradle served as a suitable substitute for weights or springs to drive the mechanism.

C. R. Rand of Dubuque combined a trunk with a bureau so they could be closed up like a trunk or extended to form a combined bureau, wardrobe, writing desk and bookcase.

A mosquito canopy was patented by Marshall Bliss of Grinnell. The canopy which enveloped the whole or a portion of the bed was so arranged that it could be brought into position or entirely removed by the person in bed without his changing position.

Bedsteads (incl. bedsprings) (33): Bell, Cedar Falls; Bradway, Maquoketa; Bush, Indianola; Clark, Mt. Pleasant; Clippinger & Pratt, Newton; Crandall, Canton; Dougherty, Mt. Pleasant; Farber, Mt. Pleasant; Faulkner, Mt. Pleasant; Freeman, Burlington; Hampton (2), Mt. Pleasant; Harper, Hillsborough; Howell, Mt. Pleasant; Kenyon, Webster City; Martin, Mt. Pleasant; Morgan, Bloomfield; McDaniel, Dubuque; Noble, Delhi; Odell & Hudson, Iowa Falls; Olds, Cedar Rapids; Osgood (3), Burlington; Osgood, Mt. Pleasant; Patton, Davenport; Potts, Ottumwa; Power, Burlington; Robbins, Dubuque; Simmons, Davenport; Todd, Mechanicsville; Walker & Lapham, Burlington; West, Burlington.

Bedstead and wardrobe combined: Morgan, Bloomfield.

Bedstead fastening: Bradway, Maquoketa.

Clothes and hat rack: Burgess, Decorah.

Clothes press: Nicholson, Anamosa.

Cradle, self-rocking: Williams, Hamilton.

Cradle, automatic: Goodman, Winterset.

Dining table: Garner, Independence.

Extension table (2): Clark, Mt. Pleasant; Hall, Fairfield.

Extension table slide: Garner, Independence.

Furniture, guard for legs of: Hartmann, Charles City.

Mosquito canopy: Bliss, Grinnell.

Sofa: Ciscor, Davenport.

Table leaf support (3): Eberhart, Cedar Falls; Forrest, Moingona; Lemon, Polk City.

Trunk: Rand, Dubuque.

Wardrobe, bedstead and bureau: Davis & Rominger, Bloomfield.

Home, Farm and Shop

The third largest group of inventions (422) was made up of items that might be found around the house, on the farm, or in a shop or store. They were varied in nature; many might be found as readily in town as in the country. Many seem quite simple to us today.

Farm Items

A number of traps were patented. They included a cage trap by Henry Bagley of Mechanicsville, used for catching prairie fowl, and the bird trap invented by Rudolph Rex of Charles City. The latter was supposed to be especially good for catching grouse and other birds which fed on the ground. Other traps were intended to catch rats, gophers and similar rodents.

Henry D. Brown of Tipton invented a sheep shearing chair. He claimed the parts that were new included oscillating racks for the sheep, adjusted and fastened by braces; a bolster attached to the chair by which the sheep's skin was prevented from wrinkling; and the manner of fastening the hind legs with straps and pins to keep the sheep from kicking the man who was shearing it.

Theodore G. Pelton of Lyons patented a "hog tamer" in 1865. To prevent a hog from rooting,

he inserted a piece of barbed wire in its nose.

An ox yoke that could be readily fitted and secured on the necks of animals was the contribution of Joseph Langenbach of Dorchester. The yoke could be adjusted to fit larger or smaller necks.

We may conclude that George W. Haviland of Ft. Dodge had encountered some pretty obstreperous cows. At any rate he patented a milking stool holder and guard to prevent a kicking animal from overturning the pail and spilling the contents.

Agricultural boiler (2): Cloud, Grinnell; Pryor & Ludwick, Kellogg.

Agricultural boiler and steamer: Hazen, Calmus.

Animal and bird trap (10): Bagley, Mechanicsville; Coppock, Dexter; Eddy & Wilber, Twin Springs; Henrie, Vandalia; Knight, Adel; McKay, Frankville; Parker, Winterset; Pittman, Ft. Madison; Rex, Charles City; Stamper, Pella.

Augers, earth (10): Ballard, Mt. Pleasant; Beach & Hanson (2), Hamburg; Burns, Anamosa; Christian, Hamburg; Gates, Perry Twp., Buchanan Co.; Harris, Dresden; Salyer (2), Corning; Wertz, Middletown.

Auger handle: Hemenway, Lansing.

Auger, well (2): Christian, Hamburg; Spees, Tabor.

Baling press: Purviance, Mt. Zion.

Branding stamp: Garretson & Draper, Oskaloosa.

Brush, rotary horse: McKay, Ossian.

Calf weaning device: Welling, Cedar Falls.

Corn crib: Clark, Pleasant Grove.

Crib ventilator: Ross, Davenport.

Doubletree: Martin, Clarence.

Draft equalizer (2): Collins & Stiles, Cedar Rapids; Shadduck, Lyons.

Equalizer, three horse draft: Toof, Ft. Madison.

Fan, grain (2): McPhail, Charles City; Reynerson, Pleasant Plain.

Feed mangers and troughs (3): Goss, Bloomfield; Steller, McGregor; Van Nest, Clayton.

Feed-water heater (2): Codling & McCunniff, Fairbank; Wilson, Columbus City.

Grapple: Dexter, Mason City.

Grain fork: Bullis, Manchester.

Hedge shears: Minor, Wapello.

Hog tamer: Pelton, Lyons.

Holdback: Kruse, Sabula.

Horse power (5): Berkely, Cedar Rapids; Bogue, Trenton; Heuermann, Davenport; Leibey, Davenport; Richardson, Onawa.

Hotbed shutter: Weed, Muscatine.

Husking glove: Titus, Independence.

Lantern: Naylor, Independence.

Line and wire tightener: Crosby, Manchester.

Manure, appliance for distributing liquid: Clark, Iowa City.

Marking stock: Devin, Ottumwa.

Middlings purifier: Scholfield, Dunlap.

Milking device: Nichols, Davenport.

Oats from wheat, screen for separating: Ferren, Decorah.

Pens for livestock (4): Dow, Davenport; Gifford (2), Pedee; Morley, Manchester.

Plant and tree protector (4): Mendenhall (2), Fairfield; Weed (2), Muscatine.

Plow clevis (3): Brison, Compentine; Stewart, Ft. Madison; Wright, Ft. Madison.

Plow clevis pin: McKinney, Earlham.

Scraper, barnyard and road (2): Langdon, Fairfield; Steffensen, Lyons.

Sheep rack: Stapleton, Iowa City.

Sheep shearing chair: Brown, Tipton.

Sheep shearing machine: Harsin & Sanders, Kirkville.

Sheep shearing table: Ellyson, West Branch.

Sheep shears: Johnson, Marshall.

Sheep, device for holding: Lewis & Lewis, Iowa City.

Sieves, grain (7): Carpenter (2), Buffalo Grove; Follett, Clermont; Mann (4), Burlington.

Snap hook: Hagny, Keokuk.

Splinter bar, three horse: Morrison, Ft. Madison.

Stool, milking (2): Haviland, Ft. Dodge; Hoit, Cedar Falls.

Tap-borer: Crocker, Maquoketa.

Tumbling rod cover: Heuermann, Davenport.

Whiffletree (2): Owen, Parkersburgh; Woeber, Davenport.

Wire and rope stretcher: Taylor, Golden Prairie.

Wood, rack for hauling: Landis, Colesburgh.

Yoke and pole coupling, neck: Skinner, Des Moines.

Yoke, ox: Langenbach, Dorchester.

Fences and Gates

Joseph F. Glidden of DeKalb, Illinois, received a patent for an "Improvement in Wire Fences" on November 24, 1874. His improvement became known as barbed wire and made possible the cheap and efficient fencing of vast areas of western farm lands.

The improvements in fences prior to that time were in making them portable, providing new types of support, and arranging the boards or slats in a new manner. For instance, Davis Harvey of Mt. Pleasant placed a narrow panel or a broad board on top of an ordinary fence. It projected

outward and upward at about 45° , far enough to prevent dogs and wolves from scaling or surmounting the fence. It was used to enclose sheep and protect them from the ravages of wild animals.

J. B. Reyman used wire to fasten pickets to rails in constructing his fence. The pickets, which were alternated, supported the rails in such a manner that the whole fence was held firmly and bound tightly together for any required length.

Iowans received 21 patents for various kinds of gates. A. L. Grinnell of Des Moines invented a gate that could be turned from the horizontal to the vertical. This left the passageway entirely clear.

A similar gate was invented by Patrick Freeman of Leroy Township, Benton County. It could be opened in the normal manner. In addition, it could be raised to a vertical position in case of obstruction, snowdrifts or rubbish. By raising it only a short distance, it allowed the passage of small animals, such as hogs and sheep, when it was desirable to separate them from larger animals.

The description of Freeman's gate does not seem to be too different from that patented by Franklin Ball of Cleona a year earlier. His gate was balanced on hinges, opening and closing like an ordinary hinged gate. At the same time it could be opened by elevating or raising it vertically. This was resorted to if there was snow or ice or

other obstruction that prevented the gate from swinging.

Fence (33): Abbott, Iowa City; Allison, West Dayton; Belt, Newton; Billings, Lyons; Brooker, Atalissa; Bundy, West Liberty; Carlisle, Columbus City; Crandal, Marshalltown; Crocker, Fredonia; Drummond, Mt. Pleasant; Ensminger, Richland; Faulkner (2), Mt. Pleasant; Force, Mt. Pleasant; Garside, Danville; Garver, Albion; Harvey, Mt. Pleasant; Haviland, Davenport; Hewett, Eagle Grove; Huxford, Boonesborough; Killian, Marshall; McMaken, Middletown; Milner, Des Moines; Montrose, Nashua; Morris, McGregor; Odell, Winterset; Orvis, Ellington; Prouty, Springfield; Reedy, Toledo; Reyman, Dubuque; Sherman, Geneseo Twp., Tama Co.; Wallis, Milton; Warner, Oskaloosa.

Fence post: Haviland, Ft. Dodge.

Fence post driver (3): Israel, Utica; Parker, Buffalo Grove; Wotson, Albia.

Gates (21): Ball, Cleona; Balschmiter, Davenport; Brown, Keokuk; Freeman, Leroy Twp., Benton Co.; Greenside, Ft. Dodge; Grinnell, Des Moines; Harrah, Davenport; Harrier, Muscatine; Kent, West Union; Munger, Cedar Falls; Munger (2), Jaynesville; Noble, LaMotte; Regan & Mensy, LaMotte; Sibley (2), Ames; Smith, Ft. Madison; Spragg & Mott, Tabor; Van Eps, Farmington; Warfield (2), Muscatine; Webb, Muscatine.

Gate post: Hutson, Iowa City.

Hinge, gate (2): Greenside, Ft. Dodge; Hoar, Floyd.

Latch, gate (5): Bourne, DeWitt; Herrick, Independence; Klein, Oskaloosa; Lawton, Algona; Redhead, Des Moines.

Hardware

Nuts, bolts, joints, connecting rods and other parts used by plumbers, machinists and manufacturers were among the hardware items patented by Iowans.

Cock, cylinder (2): Dennison, Ottumwa; Kilgore, Washington.

Cutoff, water (2): Bixby, Iowa City; Stewart, Ft. Madison.

Nuts and bolts (7): Davis, Ft. Madison; Delfer, Burlington; Miller, Marshalltown; Smith (2), Ft. Madison; Stamper, Osceola; Stuart, Cedar Rapids.

Lubricator (2): Dickinson, Dubuque; Pelton, Lyons.

Pipe joint: Hammond, Tipton.

Pitman rod (3): Fish (2), Colfax; Ketchum, Estherville.

Shackle joint: Reiner, Columbus City.

Shaft coupling (2): Ross, Davenport; Uric, Corning.

Valve, pump (3): Barnes, Maquoketa; Clark, Pulaski; Moore, Lyons.

Universal joint: Heuermann, Davenport.

Harness

The 67 patents for harness ranged from bridle rosettes to tug clips. At least thirteen of them were related in some way to horse collars. C. J. Fisher of Waukon patented a collar with a wooden front portion. The rear portion was of leather or other flexible material.

A. A. Livingston placed an India rubber foot-piece in a stirrup. The foot was prevented from slipping in the stirrup, and the horse and rider were relieved from much of the jarring and jolting that came from using ordinary stirrups.

Iowa newspapers frequently printed lists of patents that had been issued recently. On January 18, 1868, the *Des Moines Register* listed a patent for a "Pad Crimp Press" granted to George Kennedy of Clarksville in Butler County. The newspaper writer added the following comment: "We suppose that last machine is a female machine—

at least, 'pads' and 'crimps' are suggestive of 'made-up' women. The patentee has doubtless been studying the female 'human form divine,' and seems to have had models to study by."

The writer in the *Register* was slightly in error. The pad crimp press was a machine by which the back pads of harness could be easily and accurately formed.

Awning frame for horses: Pullman, New Oregon.

Collar, horse (13): Barton & Stanley, Washington; Bratnober, Ft. Dodge; Fisher (3), Waukon; Gordon, Brighton; Harbaugh, Washington; Hull, Oskaloosa; Jones, Burlington; McClure (2), Wyoming; Sharp & Shannon, Tama City; Shipley & Moody, Montezuma.

Bridle: Mason, Bentonsport.

Bridle rosette: O'Brien, Cedar Rapids.

Buckles, harness (13): Abeel, Marshalltown; Barrows, Centerville; Brooks, Mt. Pleasant; Brown, Albia; Cissna, Burlington; Gaston, Lyons; Hagny, Keokuk; Kittleman (2), Bloomfield; Martin, Mt. Pleasant; McMillan & Rowan, Webster City; Schwaner, Keokuk; Seifert, Knoxville.

Halter: Porter, Ottumwa.

Halters, manufacturing: Ware, Burlington.

Hames (6): Alexander, Manchester; Kittleman, Bloomfield; Paddington & Crew, Waubeck; Stansbury, Marion; Tompkins & Wegand, Clarksville; Woolsey, Bloomfield.

Harness attachments (10): Beebee, Dubuque; Dickinson, Dubuque; Devin, Ottumwa; Garrett, Mt. Pleasant; Kerr, Ames; Lerew, Panora; Moore (2), Albia; Ward, Ward's Corner; Welpton, Tabor.

Harness tree (2): Sharp & Shannon, Tama City; Sturgess, Washington.

Line loop: McMillan, Osage.

Horse neck-pad: Fisher, Waukon.

Pad billet: Hays, Ames.

Pad crimp press: Kennedy, Clarksville.

Rein holder (2): Fahrney, Deep River; Gray, Elkader.

Saddle-tree, lady's: Rhodes & Hazlewood, Bloomfield.

Stirrup: Livingston, Cedar Rapids.

Trace attachments (8): Dowell, Vinton; Hiatt, Plum Hollow; Hutchinson, Burlington; Koss, McGregor; Porter, Ottumwa; Reed, Independence; Short, Gosport; Thompson, Ottumwa.

Tug clip: Welpton, Tabor.

Housekeeping Items

Many labor saving devices and improvements in housekeeping utensils were invented and patented. The greatest emphasis was on brooms, 13 being issued on this single item. Most were means of fastening the broom corn to the handle.

The object of S. M. Sherman of Fort Dodge was to obtain a stronger and more durable method of holding broom corn together in the proper shape and fastening it. In case the handle worked loose, as frequently happened, the broom fell apart. This inventor used metal bands or hoops to clamp the broom corn which was compressed by rivets through the bands.

Before the advent of electricity, gas lights and other improved methods of lighting, the candle was of great importance. August Hengstenberg of Muscatine received Patent No. 16,056 on November 11, 1856, for his candle mold. With his machine one person could produce 20 to 30 times more candles than by hand. It molded 36 perfect candles at one time.

The wick yarn on 36 spools remained stretched at all times. The candles being molded and cooled were pulled out all at once so none was broken or remained in the molds. The machine was light enough to be moved easily from place to place even when the tallow had just been poured and was hot. The construction of an ice- and water-box served in the summer to cool off candles in the mold. Candles could be made from tallow, sperm, stearin, wax or any material with equal facility.

Insects and flies were a nuisance to most Iowans. J. B. Lunbeck of Leon developed a compound to destroy the "borer" and other worms, grubs and insects which preyed on fruit and other trees. He used one gallon pine tar, one quart soft soap, one-half pint tobacco juice and one-half gallon of strong alkali. When these were well mixed, the compound was removed from the fire. One-half pint of unslaked lime and one pint of "strong dry ashes" were added and well stirred in. Then one ounce of oil of tansay was added. The mixture should be the consistency of thick paint, Lunbeck said. It was applied to the trunk of the tree.

Edward D. Pugh of Fort Plain combined a bottle in which honey and wax had been placed, a light and a pan partly filled with soapsuds or other liquid. Moths were attracted by the light. Some would fall into the liquid and be destroyed. Others

would enter the bottle and remain until removed and killed.

Basket: Sherman, Ft. Dodge.

Brooms (13): Bates, Cedar Rapids; Carpenter, Cedar Rapids; Copson, Hamburg; Crandal, Marshalltown; Kilgore, Washington; Langdon & Kellogg, Quasqueton; Langdon & Weitman, Hazleton; Paine & Caviness, Fairfield; Power, Middleton; Sherman (2), Ft. Dodge; Smith, Muscatine; Weitman, Independence.

Brush, scrubbing: Wood, DeWitt.

Bucket, wood: Vail, Keokuk.

Candle mold: Hengstenberg, Muscatine.

Carpet fastener: Clark, Des Moines.

Carpet sweeper: Hess, West Union.

Comb cleaner: Toof, Ft. Madison.

Dust pan: Morgan, Davenport.

Fire kindler (5): Batcheller, Des Moines; Lowe, Ottumwa; Smith, Dubuque; Van Ausdall, Keokuk; Winkley, Des Moines.

Fly trap (3): Parker, Dubuque; Rosentrater, Des Moines; Whitmore & Beebe, Waterloo.

Foot-warmer and reflecting lamp combined: Merwin & Metcalf, Dubuque.

Insect destroyer (4): Bennett, Janesville; Lunbeck, Leon; Pugh, Ft. Plain; Shockey, Mt. Pleasant.

Lantern, insect trap: Pitman, West Point.

Matchbox: Burhans, Burlington.

Mop (2): Kirkwood & Riley, Iowa City; Cook, Sioux City.

Mop wringer: Bradway, Maquoketa.

Mop wringer and scrubber combined: Winter, Cedar Falls.

Picture frame hanger: Moulton, Des Moines.

Potato bugs, machine for destroying: Pitchforth & Benson, Muscatine.

Quilting frame: Simmons, Chariton.

Razor strap: Wolf, Ft. Madison.

Safe, kitchen: Coletrane, Cedar Twp., Van Buren Co.

Shawl or dress pins: Strong, Lansing.

Toilet case: Dapron, Davenport.

Items for the House

Many items closely related to the house were invented. Among these were door bolts and latches, flooring, lightning rods and window blinds of various types.

William Hall of Dubuque patented "William Hall's Continuous Cylindrical Lightning-Rod" in 1868. He claimed these advantages: perfect continuity; perfect uniformity, causing an equal distribution of the free electricity over the entire surface of the conductor, and offering no obstruction to its transmission; and great strength and durability.

Nathaniel Otis of Charles City patented a hollow lightning-rod formed without joint or break from top to bottom.

Round sticks in place of flat strips or slats were used as sections of a window shade by Adolph Binner of Muscatine. They were not likely to cut or quickly wear out the cords. T. B. James, also of Muscatine, used square or lozenge shaped sticks woven together so the passage of the sun's rays was prevented, but light and air could pass through the inclined spaces between the sticks.

S. M. Sherman of Ft. Dodge used metallic in-

stead of wooden dowels in his window blind. *The Dubuque Times* noted that to all appearances it could be constructed cheaply. It was simple, convenient, and "we should think will soon come into general use."

The firm of Herrick and Sherwood was in business in Independence from 1862 to 1868. They sold watches, jewelry and silverware. It is interesting to note that C. F. Herrick's four patents did not pertain to any of these. Instead he invented curtain fixtures and door latches.

Alarm lock: Swingle, Davenport.

Blinds, window and venetian (7): Andresen & Aabahr, Davenport; Byam, Ft. Dodge; Sherman (2), Ft. Dodge; Sloan (2), Hamburg; Swafford, Butler & Hess, Muscatine.

Burglar and fire alarm: Giebrich, Ottumwa.

Cistern regulator (2): Beach, Iowa City; Plumb, Davenport.

Curtain fixtures (6): Herrick (2), Independence; Hobart, Mt. Pleasant; Marinus, Independence; Smith & Foster, Des Moines; Taylor, Dubuque.

Doorbell: Stuart, Cedar Rapids.

Door catch (3): Blood, Independence; Devin, Ottumwa; Phillips, Council Bluffs.

Door lock (3): Clark, Mt. Pleasant; Fisher, Waukon; Roberts, Lacona.

Doors, hanging: Holly, Low Moor.

Fire alarm: Coulson, Oskaloosa.

Fire escapes (7): Buttkereit, Toledo; Hancock, Lansing; Heuermann (2), Davenport; Knocke, Davenport; Sharp & Hollenbeck, Tama City; Wahle, Davenport.

Floor: Wood, Marion.

Keyhole guard: Russell, Prairie City.

Latch, door (3): Gammell, Spring Valley; Herrick, Independence; Stuart, Plainfield.

Lightning rod (2): Hall, Dubuque; Otis, Charles City.

Mirror, window: Voss & Brandt, Davenport.

Sash and door bolt: Woodman, Dubuque.

Sash balance: Rand, Dubuque.

Sash cord clamping device: Rand, Dubuque.

Sash fastener (6): Ball, Wilton Junction; Bonnell, Ft. Madison; Clark (2), Mt. Pleasant; Coin, Boonesborough; Smith, Cedar Falls.

Sash frame: Cowdery, Wheatland.

Sash holder (8): Ball, Sioux City; Cowles, Burlington; Hanna, Rossville; Kramers, Marion; LaDue, Carroll City; Morgan, Davenport; Sweetzer, Hamburg; Wilmot, Montana.

Shutter fastener: Hanna, Rossville.

Shutter, window (2): Brown, Springville; Sherman, Ft. Dodge.

Window cord locking device: Rand, Dubuque.

Window shade (5): Binner, Muscatine; James, Muscatine; Marinus, Independence; Simmons, Davenport; Vetter, Muscatine.

Tools

Iowa inventors turned their attention to improving wrenches, screwdrivers, ax handles, and other tools in common use. David Drummond of McGregor patented a screwdriver that revolved like a brace or in the ordinary manner by revolving the handle. W. A. Sharp of Tama City combined a spirit level, try square, bevel, sliding gage, foot rule and marking gages in a single instrument.

Samuel W. Wakefield of Keokuk patented a wrench with a tapered slot that would fit nuts of various sizes. There is a striking resemblance to wrenches being sold at present.

Benjamin D. Stevens of Decorah used a wedge shaped piece of rubber in fastening an ax head on the handle. He called it "Stevens' Handle Saver." The vise of H. C. Hunt of Ottumwa was constructed so that it would retain itself upon a table or bench.

Adjustable bit: Jonas, Burlington.

Ax handle: Stevens, Decorah.

Ax handle guard: Hoit, Cedar Falls.

Bevel: Sharp, Tama City.

Bolt cutters (4): Butler & Dunham, Marshalltown; Peters, Davenport; Taylor, Onslow; Thiesen, Waukon.

Bung cutter: Sternberg, Davenport.

Chain hook: Weed, Lyons.

Depthing tool: Rush, Fairfield.

Drill: Nottingham & Duncan, Vinton.

Drilling and babbiting jig: Underwood, Muscatine.

Floor clamp (2): Blinn & Hewett, Dubuque; Patlock, Pleasant Grove, & Smith, Toolesborough.

Gage and try square (2): Castle (2), Montana.

Grindstone: Farris & Miller, Red Rock.

Hammer, power: Harrison, Maquoketa.

Hay knife: Wolfe, Lytle City.

Ice cutter: Marvin, Keokuk.

Joiner's clamp: Todd, Mechanicsville.

Lever shears: Sandgren, Lyons.

Lifting jack: Diver, Boone.

Measuring can for liquids: Bridge, Leon.

Metal cutter and shearer: Dubois, Boonesborough.

Pinchers and grappling tool: Dexter, Mason City.

Pipe wrench: Woodruff, Lansing.

Plane: Odell, Winterset.

Plane bench: Hunt, Ottumwa.

Planing irregular surfaces, machine for: Nelson, Oskaloosa.

Pruning shears (3): Bell, Wapello; Gilbert, Camanche; Samson & Dill, Crawfordsville.

Punch, portable: Lafely, Ottumwa.

Saw filing and setting machine: Ross, Mitchellville.

Saw filing gage: Tyson, Otho.

Screw driver: Drummond, McGregor.

Screw-wrench: McDonald, Dubuque.

Shovel handle: Alsip, McGregor.

Tool handle fastening: Sweat, Harlan.

Try square: Toof, Ft. Madison.

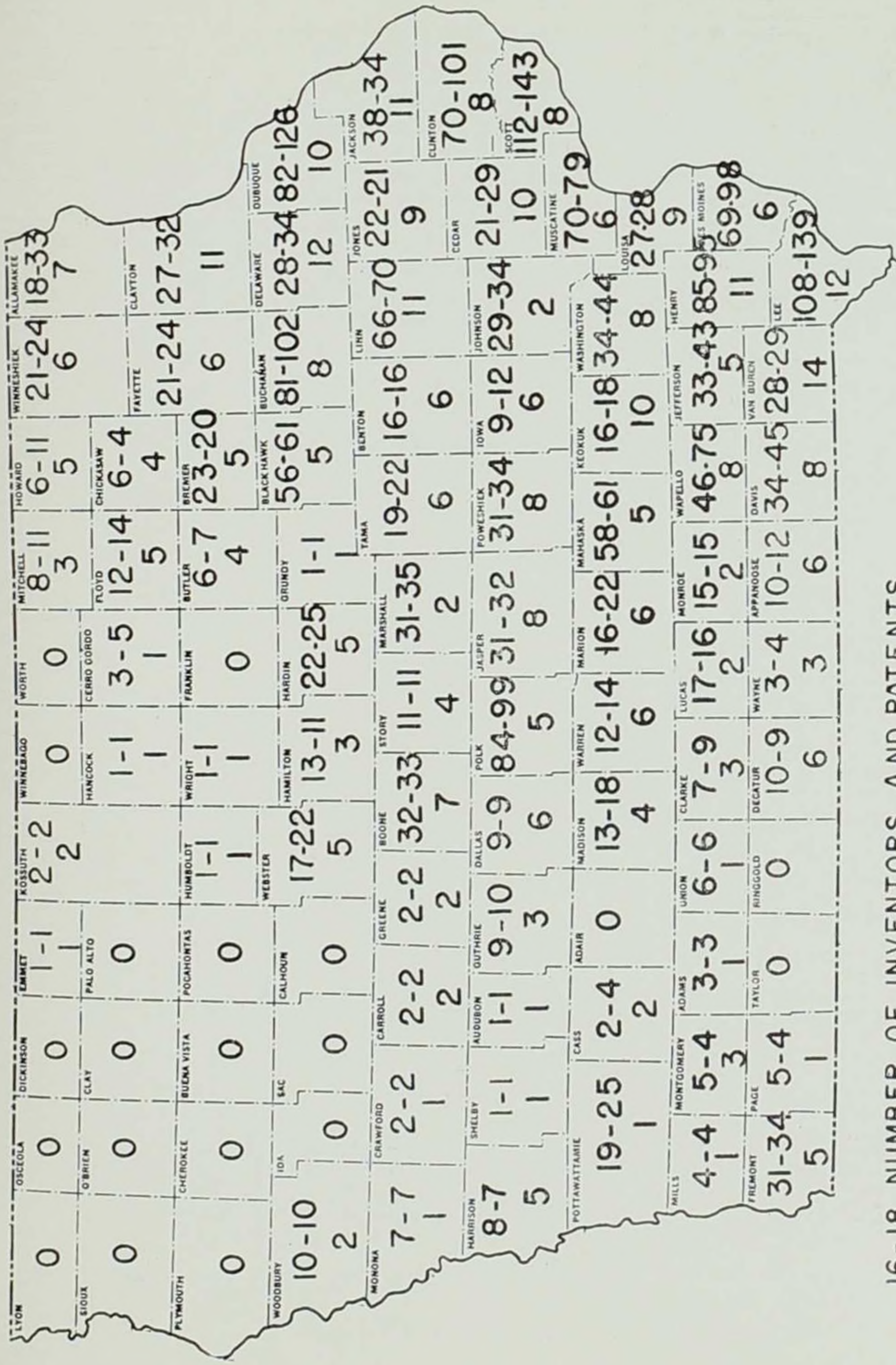
Vise (2): Hunt, Ottumwa; Johnson, DeWitt.

Wire cutter: Johnson, Marshalltown.

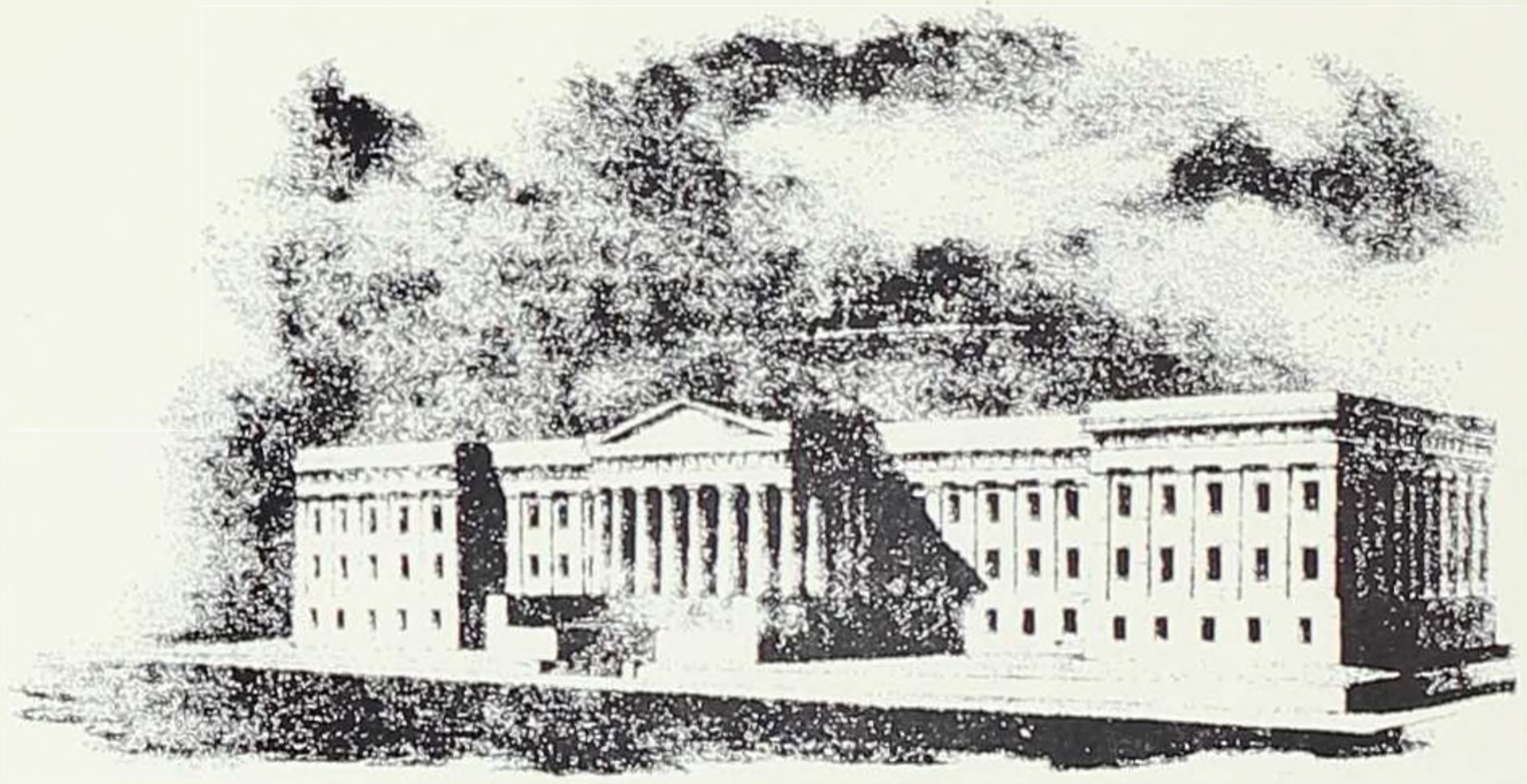
Wrench (5): Delfor, Burlington; Dunlap, Maquoketa; McDonald, Dubuque; Owen, Homer; Wakefield, Keokuk.

Wrench and grappling tool: Dexter, Mason City.

INVENTORS, PATENTS ISSUED AND TOWNS REPRESENTED



16-18 NUMBER OF INVENTORS AND PATENTS
10 NUMBER OF TOWNS REPRESENTED



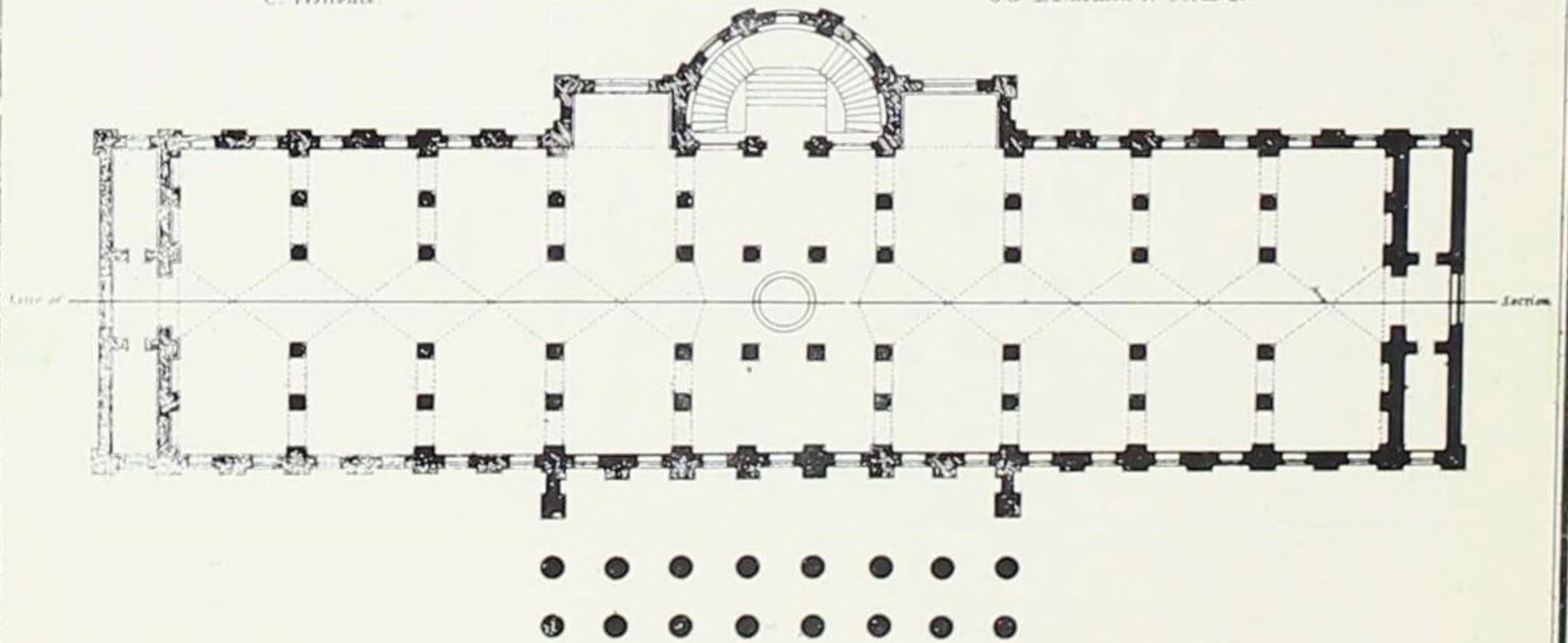
S. VIEW OF THE NEW PATENT OFFICE.



LONGITUDINAL SECTION OF THE CENTRE BUILDING COMPLETED.

Reference.
 AAA. Exhibition Room of Manufactures &c. 273 ft. by 63.
 B. Model Room.
 C. Vestibule.

DDDD. Officers Apartments.
 E. Exhibition Room for Agricultural Improvements.
 F. Vestibule of Basement.
 GG. Exhibition of Seeds &c.



PLAN OF NATIONAL GALLERY OF AMERICAN MANUFACTURES AND AGRICULTURE.

J. Mearns, Lith. Work. Copy.